Vol. 1110 Number 3

OFFICIAL GAZETTE

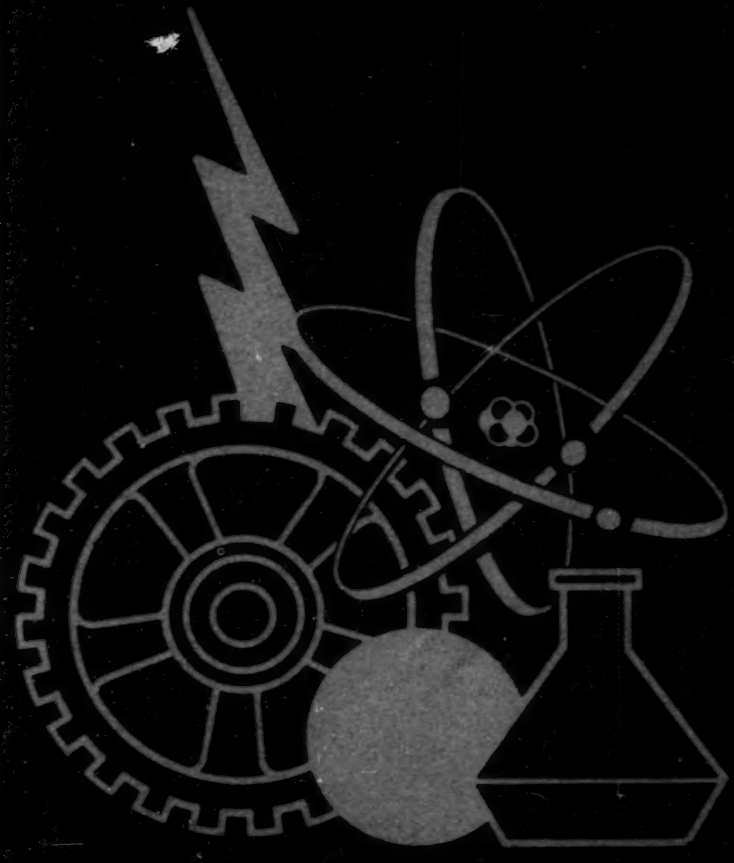
of the

UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

PATENTS

January 16, 1990



U.S.
DEPARTMENT
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Office

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

OFFICIAL GAZETTE of the
UNITED STATES PATENT AND TRADEMARK OFFICE

January 16, 1990 Volume 1110 Number 3

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The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed.

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.
GENERAL INFORMATION concerning PATENTS.
GENERAL INFORMATION concerning TRADEMARKS.

COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.50 each; PLANT PATENTS in color, $10.00 each; copies of TRADEMARKS at $1.50 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1109 O.G. 3 on Dec. 5, 1989.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 5 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988.

The search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar in relation to the German Mark as of Jan. 1, 1990, and was announced in the *Official Gazette* at 1109 O.G. 3 on Dec. 5, 1989.

International PCT fees were changed on June 1, 1989 due to a difference in the exchange rate of the U.S. dollar in relaton to the Swiss Franc and were announced in the *Official Gazette* at 1102 O.G. 90 on May 30, 1989.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees (in U.S. dollars) is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)	
—No corresponding prior U.S. national application filed	550.00
—Corresponding prior U.S. national application filed	380.00
—Supplemental search fee, per additional invention	150.00
European Patent Office as ISA	1140.00
Preliminary examination fee	
USPTO as International Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as ISA.	400.00
—Additional examination fee, per additional invention	130.00
—ISA not the USPTO	600.00
—Additional examination fee, per additional invention	200.00
International fees	
Basic fee	436.00
Basic Supplemental fee (for each page over 30)	9.00
Designation fee per country or region for the first 10 national or regional offices	106.00
Designation fee for 11th and subsequent designations	No Charge
Handling fee	134.00

U.S. National Stage fees

	Small Entity	Regular
USPTO was IPEA	165.00	330.00
USPTO was ISA but not IPEA	185.00	370.00
USPTO was neither ISA nor IPEA	250.00	500.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4)	25.00	50.00
—For each independent claim in excess of 3	18.00	36.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	60.00	120.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39(1)	60.00	120.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1)	30.00	30.00

Dec. 18, 1989

JEFFREY M. SAMUELS
Acting Commissioner of Patents and Trademarks.

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on January 13, 1987 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,635,300 through 4,637,073
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on January 11, 1983 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,367,561 through 4,368,543
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), (f), (h) and (i), as amended effective Apr. 17, 1989, which are reproduced below:

37 CFR § 1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force

beyond 4 years; the fee is due by three years and six months after the original grant.....$245.00

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant.....$495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27,1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)).....$245.00
By other than a small entity.....$490.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§1.9(f)).....$495.00
By other than a small enttity.....$990.00"

The amounts of the surcharges as amended effective Apr. 17, 1989, are set forth in 37 CFR 1.20 (k), (l) and (m) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months , seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27,1982.....$120.00

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(§1.9(f)).....$60.00
By other than a small entity.....$120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable.....$550.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED OCTOBER 29, 1989 DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,297,508	06/218,973	10/27/81
4,549,318	06/696,190	10/29/85
4,549,321	06/712,717	10/29/85
4,549,322	06/449,868	10/29/85
4,549,326	06/676,581	10/29/85
4,549,331	06/541,357	10/29/85
4,549,339	06/479,308	10/29/85
4,549,357	06/572,557	10/29/85
4,549,358	06/614,242	10/29/85
4,549,369	06/557,428	10/29/85
4,549,370	06/458,997	10/29/85
4,549,377	06/526,004	10/29/85
4,549,381	06/548,187	10/29/85
4,549,385	06/649,916	10/29/85
4,549,387	06/511,203	10/29/85
4,549,396	06/339,962	10/29/85
4,549,400	06/599,961	10/29/85
4,549,401	06/494,765	10/29/85
4,549,406	06/624,664	10/29/85
4,549,413	06/653,948	10/29/85
4,549,417	06/555,285	10/29/85
4,549,420	06/509,019	10/29/85
4,549,421	06/602,430	10/29/85
4,549,441	06/493,543	10/29/85
4,549,442	06/522,742	10/29/85
4,549,444	06/424,376	10/29/85
4,549,455	06/482,763	10/29/85
4,549,463	06/568,345	10/29/85
4,549,466	06/604,106	10/29/85
4,549,468	06/575,987	10/29/85
4,549,478	06/620,683	10/29/85
4,549,486	06/614,075	10/29/85
4,549,497	06/557,608	10/29/85
4,549,502	06/369,919	10/29/85
4,549,515	06/687,899	10/29/85
4,549,520	06/635,242	10/29/85
4,549,522	06/656,991	10/29/85
4,549,536	06/533,127	10/29/85
4,549,542	06/516,687	10/29/85
4,549,557	06/547,605	10/29/85
4,549,558	06/637,963	10/29/85
4,549,582	06/612,337	10/29/85
4,549,591	06/626,282	10/29/85
4,549,615	06/397,423	10/29/85
4,549,625	06/584,190	10/29/85
4,549,626	06/525,658	10/29/85
4,549,633	06/664,546	10/29/85
4,549,636	06/546,863	10/29/85
4,549,639	06/577,183	10/29/85
4,549,642	06/464,934	10/29/85
4,549,648	06/467,359	10/29/85
4,549,654	06/668,968	10/29/85
4,549,656	06/521,621	10/29/85
4,549,674	06/472,622	10/29/85
4,549,680	06/677,247	10/29/85
4,549,684	06/469,776	10/29/85
4,549,689	06/522,744	10/29/85
4,549,690	06/634,633	10/29/85
4,549,697	06/502,493	10/29/85
4,549,709	06/349,889	10/29/85
4,549,710	06/469,121	10/29/85
4,549,714	06/541,586	10/29/85
4,549,716	06/561,659	10/29/85
4,549,722	06/617,512	10/29/85
4,549,724	06/385,386	10/29/85
4,549,725	06/676,412	10/29/85
4,549,726	06/540,889	10/29/85
4,549,735	06/611,337	10/29/85
4,549,738	06/605,169	10/29/85
4,549,747	06/500,057	10/29/85
4,549,755	06/505,053	10/29/85
4,549,757	06/568,260	10/29/85
4,549,758	06/582,024	10/29/85
4,549,759	06/487,319	10/29/85
4,549,762	06/620,727	10/29/85
4,549,765	06/565,313	10/29/85
4,549,778	06/595,617	10/29/85
4,549,793	06/702,832	10/29/85
4,549,798	06/516,771	10/29/85
4,549,811	06/498,566	10/29/85
4,549,825	06/633,609	10/29/85
4,549,831	06/545,631	10/29/85
4,549,832	06/442,776	10/29/85
4,549,834	06/536,990	10/29/85
4,549,843	06/475,439	10/29/85
4,549,844	06/566,151	10/29/85
4,549,845	06/526,443	10/29/85
4,549,846	06/488,079	10/29/85

Patent Number	Serial Number	Issue Date
4,549,847	06/438,990	10/29/85
4,549,858	06/727,606	10/29/85
4,549,861	06/626,537	10/29/85
4,549,868	06/631,441	10/29/85
4,549,870	06/525,234	10/29/85
4,549,873	06/593,194	10/29/85
4,549,877	06/458,265	10/29/85
4,549,903	06/538,312	10/29/85
4,549,915	06/579,892	10/29/85
4,549,925	06/443,562	10/29/85
4,549,939	06/605,506	10/29/85
4,549,948	06/271,490	10/29/85
4,549,959	06/656,201	10/29/85
4,549,964	06/500,207	10/29/85
4,549,971	06/613,564	10/29/85
4,549,974	06/535,132	10/29/85
4,549,982	06/664,058	10/29/85
4,549,983	06/589,472	10/29/85
4,550,009	06/582,442	10/29/85
4,550,016	06/429,662	10/29/85
4,550,023	06/643,460	10/29/85
4,550,027	06/618,278	10/29/85
4,550,028	06/392,144	10/29/85
4,550,029	06/618,306	10/29/85
4,550,035	06/605,054	10/29/85
4,550,038	06/538,564	10/29/85
4,550,039	06/585,238	10/29/85
4,550,042	06/516,984	10/29/85
4,550,090	06/659,505	10/29/85
4,550,093	06/616,521	10/29/85
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4,550,204	06/474,175	10/29/85
4,550,222	06/400,997	10/29/85
4,550,247	06/570,674	10/29/85
4,550,253	06/486,020	10/29/85
4,550,259	06/515,524	10/29/85
4,550,267	06/744,887	10/29/85
4,550,276	06/388,230	10/29/85
4,550,292	06/529,803	10/29/85
4,550,297	06/479,717	10/29/85
4,550,299	06/627,668	10/29/85
4,550,300	06/609,042	10/29/85
4,550,316	06/489,828	10/29/85
4,550,320	06/547,426	10/29/85
4,550,321	06/603,261	10/29/85
4,550,332	06/319,369	10/29/85
4,550,336	06/526,701	10/29/85
4,550,337	06/482,821	10/29/85
4,550,342	06/518,169	10/29/85
4,550,350	06/515,128	10/29/85
4,550,352	06/436,684	10/29/85
4,550,363	06/652,031	10/29/85
4,550,381	06/317,816	10/29/85
4,550,384	06/431,327	10/29/85
4,550,385	06/403,437	10/29/85
4,550,391	06/468,129	10/29/85
4,550,403	06/479,905	10/29/85
4,550,406	06/504,270	10/29/85
4,550,407	06/504,305	10/29/85
4,550,430	06/236,276	10/29/85
4,550,442	06/615,573	10/29/85

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

4,613,371, Re. S. N. 247,786, Filed Sept. 21, 1988, Cl. 75/255, METHOD FOR MAKING ULTRAFINE METAL POWDER, Richard F. Cheney, et al., Owner of Record: *GTE Products Corp., Stamford Conn.*, Attorney or Agent: Donald R. Castle, Ex. Gp.: 111

4,685,091, Re. S. N. 389,669, Filed Aug. 4, 1989, Cl. 367/31, METHOD AND APPARATUS FOR ACOUSTIC WELL LOGGING, Jing-Yau Chung, Owner of Record: *Exxon Production Research Company*, Attorney or Agent: Michael A. Nametz, et al., Ex. Gp.: 222

4,697,244, Re. S. N. 414,480, Filed Sept. 29, 1989, Cl. 364/520, COORDINATE INPUT DEVICE WITH DISPLAY AND PRINTER, Azuma Murakami, et al., Owner of Record: *Wacom Co. Ltd., Saitama, Japan*, Attorney or Agent: Allan M. Lowe, et al., Ex. Gp.: 231

4,697,261, Re. S. N. 414,468, Filed Sept. 29, 1989, Cl. 379/59, CELLULAR TELEPHONE DATA COMMUNICATION SYSTEM AND METHOD, Harry M. O'Sullivan, Owner of Record: *Spectrum Cellular Communications Corp. Inc., Dallas, Tex.*, Attorney or Agent: Charles M. Leedom, Jr., et al., Ex. Gp.: 261

4,709,454, Re. S. N. 444,605, Filed Nov. 30, 1989, Cl. 24/590, AXIAL LOCKING DEVICE, Austen B. Barnes, Owner of Record: *Inventor*, Attorney or Agent: Remy J. Vanophem, Ex. Gp. 357

4,715,498, Re. S. N. 445,367, Filed Dec. 4, 1989, Cl. 206/366, SHARPS DISPOSAL SYSTEM, Paul H. Hanifi, Owner of Record: *Sage Products, Inc., Cary Ill.*, Attorney or Agent: Wm. Marshall Lee, et al., Ex. Gp.: 241

4,726,081, Re. S. N. 444,284, Filed Dec. 1, 1989, Cl. 4/564, BATH WITH A VERTICALLY MOVABLE SEAT, Ricard W. Duffin, et al., Owner of Record: *Inventor*, Attorney or Agent: Edmund M. Jaskiewicz, Ex. Gp.: 243

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b).

4,203,639, Reexam. No. 90/001,901, Requested Dec. 4, 1989, Cl. 339/22, PANEL WIRING SYSTEM, Harold L. Vanderhoek, et al., Owner of Record: *Steelcase Inc., Grand Rapids, Mich.*, Attorney or Agent: Price, Heneveld & Cooper, et al., Ex. Gp.: 320, Requester: Haworth Inc., Holland, Mich.

4,683,195, Reexam No. 90/001,902, Requested Dec. 6, 1989, Cl. 430/6, PROCESS FOR AMPLIFYING DETECTING AND/OR CLONING NUCLEIC ACID SEQUENCES, Kary B. Mullis, et al., Owner of Record: *Cetus Corp. Emeryville, Calif.*, Attorney or Agent: A. P. Halluin, Ex. Gp.: 120, Requester: Pennie & Edmonds, New York, N. Y.

4,683,202, Reexam No. 90/001,903, Requested Dec. 6, 1989 Cl. 435/91, PROCESS FOR AMPLIFYING NUCLEIC ACID SEQUENCES, Kary P. Mullis, Owner of Record: *Cetus Corp., Emeryville, Calif.*, Attorney or Agent: A. P. Halluin, Ex. Gp.: 120, Requester: Pennie & Edmonds, New York, N. Y.

PATENT TERMS EXTENDED UNDER 35 USC 156

Certificates extending the terms of the following patents were issued on December 11, 1989.

Patent No. 4,395,403, granted July 26, 1983 to Wilfried Bauer, et al., Owner of Record: Sandoz, Ltd., Title: NOVEL

POLYPEPTIDES, PROCESSES FOR THEIR PRODUCTION, PHARMECUETICAL COMPOSITIONS COMPRISING SAID POLYPEPTIDES AND THEIR USE, Classificqation: 514-12, Product Trade Name: Sandostatin, Term Extended: 2 years.

Patent No. 3,965,143, granted June 22, 1976 to Paul W. Collins, et al., Owner of Record: G. D. Searle & Co., Title: 16-OXYGENATED PROSTANOIC ACID DERIVATIVES, Classification: 560-118, Product Trade Name: Cytotec, Term Extended: 2 years.

Patent No. 4,166,182, granted August 28, 1979 to Edmund C. Kornfeld, et al., Owner of Record: Eli Lilly and Company, Title: 6-N-PROPYL-8-METHOXYMETHYL OR METHYLMERCAPTO-METHYLERGOLINES AND RELATED COMPOUNDS, Classification: 546-67, Product Trade Name: Permax, Term Extended: 2 years.

Patent No. 4,396,598, granted August 2, 1983 to Youlin Lin, Owner of Record: Mallinckrodt, Inc., Title: TRIIODOISOPHTHALAMIDE X-RAY CONTRAST AGENT, Classification: 166-85, Product Trade Name: Optiray, Term Extended: 815 days.

Patent No. 4,219,559, granted August 26, 1980 to Frans Janssens, et al., Owner of Record: Janssen Pharmeceutical N. V., Title: N-HETEROCYCYL-4-PEPERIDINAMINES, Classification: 514-322, Product Trade Name: Hismanal, Term Extended: 2 years.

Patent No. 3,985,758, granted October 12, 1976 to Masuo Murkami, et al., Owner of Record: Yamanouchi Pharmaceutical Co. Ltd., Title: 1, 4-DIHYDROPYRIDINE DERIVATIVES, Classification: 546-321, Product Trade Name: Cardene, Term Extended: 2 years.

Patent No. 3,910,924, granted October 7, 1975 to Yasumitsu Tamura, et al., Owner of Record: Otsuka Pharmaceutical Co., Ltd., Title: 3, 4-DIHYDROCARBOSTYRIL DERIVATIVES AND A PROCESS FOR PREPARING THE SAME, Classification: 546-158, Product Trade Name: Cartrol, Term Extended: 2 years.

Patent No. 4,241,057, granted December 23, 1980 to Kenzo Ishizuka, et al., Owner of Record: Takeda Chemical Industries, Ltd., Title: ANTIBIOTIC COMPOSITIONS, Classification: 514-206, Product Trade Name: Ceradon, Term Extended: 2 years.

Patent No. 4,406,906, granted September 27, 1983 to Horst Meyer, et al., Owner of Record: Bayer Aktiengesellschaft, Title: CEREBRAL THERAPEUTIC AGENT AND ITS USE, Classification: 514-356, Product Trade Name: Nimotop, Term Extended: 2 years.

Patent No. 3,732,340, granted May 8, 1973 to Herbert Arnold, et al., Owner of Record: Asta Pharma AG, Title: N',O-PROPYLENE PHOSPHORIC ACID ESTER DIAMIDES, Classification: 558-81, Product Trade Name: Ifex, Term Extended: 2 years.

Patent No. 4,220,660, granted September 2, 1980 to Norbert Brock, Owner of Record: Asta Pharma AG, Title: PROCESS FOR THE TREATMENT OF HUMANS SUFFERING FROM UNDESIRED UROTOXIC SIDE EFFECTS CAUSED BY CYTOSTATICALLY ACTIVE AKLYLATING AGENTS, Classification: 514-78, Product Trade Name: Mesnex, Term Extended 821 days.

DEPARTMENT OF COMMERCE
Patent and Trademark Office
[Docket No. 91283-9283]

Request for Information Regarding Process Patent Amendments Made by the Omnibus Trade and Competitiveness Act of 1988

Agency: Patent and Trademark Office, Commerce.

Action: Request for information from domestic industries regarding possible adverse effects of the process patent amendments made by the Omnibus Trade and Competitiveness Act of 1988 (Pub. L. 100-417).

Date: Comments must be received on or before February 9, 1990.

For Further Information Contact: Documents and questions should be submitted to H. Dieter Hoinkes, Office of Legislation and International Affairs, Box 4, Patent and Trademark Office, Washington, D. C. 20231. Telephone at (703) 557-3065.

Supplementary Information: The Omnibus Trade and Competitiveness Act of 1988 (Pub. L. 100-417) was enacted on August 23, 1988. Among other things, the Act amended title 35, United States Code, to extend the protection of a process patented in the United States also to products made by that process. As a consequence, whoever without authority imports into the United States, or sells or uses in this country, a product made by a patented process shall be liable as an infringer, if the importation, sale or use, occurs during the term of the processs patent. (Sections 9002 and 9003 of Pub. L. 100-417). The effective date of that amendment is February 23, 1989.

Section 9007 of the Act requires the Secretary of Commerce to report to the Congress, at the end of each one-year period from the effective date of the above amendments, on the effect of these amendments on those domestic industries that submitted complaints during such period, alleging that their legitimate sources of supply have been adversely affected. Such reports must be submitted for five successive years.

The first report from the Secretary of Commerce to the Congress will be submitted on February 23, 1990, covering the preceding one-year period. Accordingly, it is requested that domestic industries wishing their complaints reflected in the Secretary's report ensure that any submission on this subject is received by the Department of Commerce not later than February 9, 1990.

December 19, 1989

JEFFREY M. SAMUELS
Acting Commissioner
of Patents and Trademarks

PATENT NOTICES

Certificates of Correction For Week of January 16, 1990

4,520,493	4,803,591	4,822,528	4,838,426
4,596,734	4,803,599	4,822,542	4,829,357
4,693,725	4,805,013	4,822,736	4,829,428
4,706,079	4,806,680	4,822,816	4,829,460
4,715,471	4,807,196	4,822,854	4,829,595
4,733,281	4,808,394	4,823,235	4,829,614
4,738,350	4,810,381	4,823,386	4,829,911
4,749,443	4,811,373	4,823,394	4,829,998
4,749,667	4,811,435	4,823,427	4,830,133
4,751,307	4,812,191	4,823,781	4,830,290
4,751,347	4,812,434	4,823,901	4,830,611
4,757,037	4,812,680	4,824,232	4,830,794
4,762,599	4,814,165	4,824,352	4,830,999
4,764,523	4,814,894	4,824,493	4,831,236
4,772,645	4,815,956	4,824,519	4,831,928
4,779,060	4,816,028	4,824,694	4,832,354
4,780,105	4,816,586	4,824,709	4,832,445
4,780,175	4,816,711	4,825,062	4,832,607
4,782,296	4,816,824	4,825,170	4,832,687
4,783,751	4,816,844	4,825,445	4,832,738
4,784,142	4,816,966	4,825,757	4,832,791
4,786,430	4,817,451	4,825,929	4,832,889
4,786,816	4,818,394	4,826,515	4,833,170
4,789,794	4,818,438	4,826,682	4,833,195
4,790,315	4,818,654	4,826,741	4,833,735
4,797,403	4,819,012	4,826,784	4,833,876
4,798,810	4,819,022	4,826,822	4,833,894
4,800,152	4,819,028	4,827,032	4,834,565
4,800,278	4,820,501	4,827,049	4,835,242
4,800,401	4,820,871	4,827,161	4,835,312
4,801,484	4,821,058	4,827,358	4,836,727
4,801,662	4,821,955	4,827,531	4,844,602
4,802,032	4,822,019	4,827,660	4,846,054
4,802,969	4,822,169	4,828,022	
4,803,203	4,822,449	4,828,063	

Disclaimer

4,621,144.—*Yoshiyuki Okada*, Suita; *Yasuo Sato*, Kyoto, both of Japan. 1-PHENYL-4-HYDROXYPYRAZOLE DERIVATIVES. Patent dated Nov. 4, 1986. Disclaimer filed July 6, 1989, by the assignee, Takeda Chemical Industries, Ltd.

Hereby enters this disclaimer to claims 1, 2 and 5 of said patent.

Disclaimer

4,631,215.—*Dennis G. Welygan*, Cottage Grove: *Ronald O. Zemke*, White Bear Lake, Both of Minn. EXTRUDED ARTICLE AND METHOD OF MAKING THE SAME. Patent dated Dec. 23, 1986. Disclaimer filed Aug. 28, 1989, by the assignee, Minnesota Mining and Manufacturing Company.

Hereby enters this disclaimer to claims 4 and 9 of said patent.

Disclaimer

4,806,248.—*Joseph S. Murken*, Springfield, Mo. HOSE CONSTRUCTION, COUPLING ARRANGEMENT THEREFOR AND METHOD OF MAKING THE SAME. Patent dated Feb. 21, 1989. Disclaimer filed Nov. 9, 1989, by the assignee, Dayco Products, Inc.

The term of this patent subsequent to Nov. 17, 2004, has been disclaimed.

Disclaimer

4,860,005.—*Joan S. DeLuca; Randi L. Dulaney*, both of Boca Raton, Fla. COMMUNICATION RECEIVER WITH AUTOMATIC TURN ON/OFF. Patent dated Aug. 22, 1989. Disclaimer filed Nov. 20, 1989, by the assignee, Motorola, Inc.

The term of this patent subsequent to Aug. 22, 2006, has been disclaimed.

Dedication

Des. 254,000.—*Michael A. Kolowski*, Tallmadge; *Daniel J. Lindner*, North Canton, both of Ohio; *Henry T. Kwee*, Stow; *Charles W. Roberts*, Akron, Ohio; *Harold D. Fetty*, Birmingham, Mich. TIRE. Patent dated Jan. 22, 1980. Dedication filed May 12, 1989, by the assignee, The Goodyear Tire & Rubber Company.

Hereby dedicates to the Public the entire term of said patent.

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Box Assignments	All assignment documents except those filed in new patent applications.

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PATENT EXAMINING CORPS

JAMES E. DENNY, Acting Assistant Commissioner
STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner
CONDITION OF PATENT APPLICATIONS AS OF December 2, 1989

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	5-26-87
ORGANIC CHEMISTRY GROUP 120—S. N. ZAHARNA, Director	6-16-87
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. V. FISHER, Acting Director	4-15-87
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	5-14-87
BIOTECHNOLOGY, GROUP 180—J. E. KITTLE, Director	1-28-87
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—D. G. Kelly, Director	10-15-87
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director	2-27-87
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—G. GOLDBERG, Director	11-16-87
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX, Director	6-7-88
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SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—C. CROYLE, Acting Director	2-26-88
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	1-3-89

Expiration of patents: The patents within the range of numbers indicated below expire during December 1989, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,704,469 to 3,707,728 inclusive
Plant Patents ..... 3262 to 3280 inclusive

REEXAMINATIONS

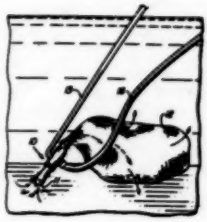
JANUARY 16, 1990

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 4,240,173 (1186th)
POOL VACUUM

John C. Sherrill, Phoenix, Ariz., assignor to Innovative Products Corporation, Phoenix, Ariz.

Reexamination Request No. 90/001,644, Nov. 22, 1988.
Reexamination Certificate for Patent No. 4,240,173, issued Dec. 23, 1980, Ser. No. 57,211, Jul. 13, 1979.
Int. Cl.[4] E04H *3/20*
U.S. Cl. 15—1.7



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

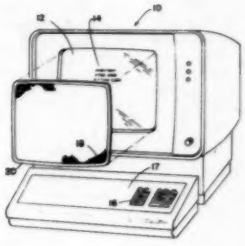
Claims 1–9 are cancelled.

[1. A pool vacuum including in combination:
a first intake hollow pipe section with a debris pick-up end and a discharge end wherein at least a portion of the discharge end thereof is cylindrical in cross section of a predetermined external diameter;
fluid discharge means comprising a second pipe section surrounding said discharge end of said first pipe section and spaced therefrom by first and second spacing means located substantially near the respective ends of said second pipe section to form a hollow chamber between the external surface of the discharge end of said first pipe section and the internal surface of the second pipe section, the second spacer located near the discharge end of said first pipe section having a plurality of apertures therethrough extending substantially parallel to the axis of said first pipe section;
a third pipe section having an inlet end and an outlet end with said inlet end having an internal diameter greater than the external diameter of said first pipe section and communicating with the apertures through said second spacer, said third pipe section being bonded to one of said spacer and said second pipe section to provide a fluid-tight bond therewith; and
means for supplying fluid under pressure to the hollow chamber formed between said first pipe section and said second pipe section to cause the discharge of such fluid through the apertures in said second spacer into the inlet end of said third pipe section for discharge from the outlet end thereof.]

B1 4,253,737 (1187th)
ANTI-GLARE DEVICE FOR A COMPUTER TERMINAL DISPLAY

Erik J. Thomsen, San Rafael, and Patrick W. Brennan, Greenbrae, both of Calif., assignors to Sun-Flex Co., San Rafael, Calif.

Reexamination Request No. 90/001,648, Nov. 29, 1988.
Reexamination Certificate for Patent No. 4,253,737, issued Mar. 3, 1981, Ser. No. 11,112, Feb. 12, 1979.
Int. Cl.[4] G02B *27/00*
U.S. Cl. 350—276 R



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1, 2 and 3 is confirmed.

1. An anti-glare device for a curved video display screen comprising:
a thin, lightweight, portable frame of a flexible material;
a microweave mesh of black filaments stretched across the inner surface of said frame;
said frame being wide enough that it resists bending in all directions in the plane of the mesh but being flexible in all directions transverse thereto so that said frame and stretched mesh will conform to the curvature of a terminal display scope to which said frame is attached; and
means for attaching said frame to a terminal display scope so that said mesh conforms to and contacts said scope over the surface thereof.

B1 4,282,521 (1188th)
REGULATING CIRCUIT FOR GASEOUS IMPURITY DETECTOR

Leonard N. Lieberman, La Jolla, Calif., assignor to TIF Instruments, Inc., Miami, Fla.

Reexamination Request No. 90/001,733, Mar. 27, 1989.
Reexamination Certificate for Patent No. 4,282,521, issued Aug. 4, 1981, Ser. No. 93,543, Nov. 13, 1979.
Int. Cl.[4] G08B *17/10*; G01M *3/04*
U.S. Cl. 340—632

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1–16 is confirmed.

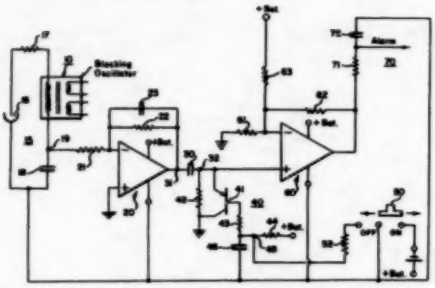
1. Apparatus for detecting gaseous impurities in an atmosphere comprising:
an asymmetrical electrode pair disposable in said atmosphere;

means for forming a corona discharge across said electrode pair in the continuous corona region;

means for forming a first signal representative of the mean corona current of said discharge, said signal being representative of the concentration of the gaseous impurity;

means for forming a second signal which is a function of said first signal;

means for storing said second signal relatively rapidly, whereby there is recorded a representation of said mean corona current at the time said second signal is stored, and for updating relatively slowly the signal that is stored;



switching means having at least two operative states, said second signal being stored relatively rapidly when said switching means is in a first state and said stored signal being updated relatively slowly when said switching means is in a second state; and

means for sensing a change in the mean corona current relative to said stored signal and for producing an output signal when said change in the mean corona current is greater than a predetermined amount.

B1 4,436,233 (1189th)

BABY CARRIER

James B. Hill, and Sally F. Hill, both of Rte. 2, Galena, Mo. 65656

Reexamination Request No. 90/001,387, Nov. 27, 1987.
Reexamination Certificate for Patent No. 4,436,233, issued Mar. 13, 1984, Ser. No. 335,682, Dec. 30, 1981.
Int. Cl.[4] A47D *13/02*
U.S. Cl. 224—159

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 1-8 are cancelled.

[1. Apparatus for carrying an infant on and by the body of an adult comprising:

a seat means adapted to be located in proximity to the waist, hip and stomach of an adult for conformable supporting engagement with the legs, buttocks and lower back of the infant;

a lower hip strap means attached to a lower portion of said seat means and adapted to be located about the hips of an adult for conformable supporting engagement with the body of the adult;

an upper shoulder strap means attached to an upper portion of said seat means and adapted to be located across the back and over the shoulder and across the chest of the adult for conformable supporting engagement with the body of the adult; and

said seat means and said hip strap means and said shoulder strap means being constructed and arranged to form said seat means into a J shape configuration providing a front

flap portion connected to and extending downwardly from said waist strap means and located between the infant and the adult and a bottom portion located in the crotch area of the infant and a back portion extending upwardly across the back of the infant and being connected to said shoulder strap means.]

B1 4,505,620 (1190th)

FLEXIBLE OFFSHORE PLATFORM

Bernard Andrier, Louveciennes, France, assignor to Entropose GTM pour les Petroliers Maritimes ETPM, Montreuil, France

Reexamination Request No. 90/001,435, Feb. 11, 1988.
Reexamination Certificate for Patent No. 4,505,620, issued Mar. 19, 1985, Ser. No. 545,153, Oct. 25, 1983.
Claims priority, application France, Sep. 22, 1983, 8315045
Int. Cl.[4] E02D *21/00*
U.S. Cl. 405—224

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claim 3 is cancelled.

Claim 1 is determined to be patentable as amended.

Claims 2 and 4-6, dependent on an amended claim, are determined to be patentable.

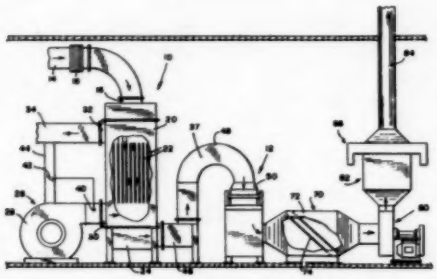
1. A flexible offshore platform comprising a foundation which fixes the platform on the sea-bed, a flexible column fixed to said foundation extending over more than half of the total height of the platform, a stabilizer fixed to the top of the flexible column, a deck and a second column connecting the stabilizer to the deck, the stabilizer being positioned to be immersed in the water and entraining a given mass of water, the mass formed by the mass of the stabilizer and the mass of water entrained by the stabilizer providing a stabilizing effect for the platform, *the stabilizer comprising at least one open shell which entrains a large quantity of water which contributes to the stabilizing effect,* and wherein the platform structure itself has a rigidity able to generate reaction stresses which resist actions due to waves, wind and current.

B1 4,662,899 (1191st)

AIR POLLUTION CONTROL SYSTEM METHOD AND APPARATUS

Jag S. Tandon, Northbrook, Ill., assignor to American Environmental International Inc.

Reexamination Request No. 90/001,796, Jun. 22, 1989.
Reexamination Certificate for Patent No. 4,662,899, issued May 5, 1987, Ser. No. 720,100, Apr. 5, 1985.
Int. Cl.[4] B01D *51/10*
U.S. Cl. 55—80



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1 to 6 is confirmed.

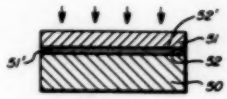
1. Apparatus for filtering vaporized organic solvents and fine particulate matter from a hot exhaust stream comprising a condenser and a filter unit; said condenser including a housing having an upper inlet and a lower outlet for said exhaust stream, baffle means within said housing defining a plurality of individual vertical flow paths with said exhaust stream communicating with an upper end of alternating flow paths and flowing downward to said lower outlet, an atmospheric pressurized fluid source in communication with the lower ends of the remaining flow paths and flowing upward to a heated fluid exit adjacent the upper end of said housing for cooling said exhaust gases and condensing said vaporized organic solvents into at least an aerosol particle mist, said filtering unit including a substantially vertical housing having an upper inlet and a lower outlet, a movable filter support bed extending across said housing and a mist-coalescing filter supported on said bed, and conduit means extending from said lower outlet of said condenser to said upper inlet of said vertical housing so that said exhaust stream flows downward through said mist-coalescing filter; pressure sensitive means for sensing the pressure differential of said exhaust stream across said mist-coalescing filter and drive means connected to said filter support bed for moving a new filter section across said vertical housing when the pressure differential exceeds a certain level with a fan downstream of said filter unit for drawing said exhaust stream through said filter unit; and a movable charcoal filter extending across said exhaust stream downstream of said fan for removing odors from said exhaust stream.

B1 4,703,336 (1192nd)

PHOTODETECTION AND CURRENT CONTROL DEVICES

Stanford R. Ovshinsky, Bloomfield Hills, and Arun Madan, Birmingham, both of Mich., assignors to Energy Conversion Devices, Inc.

Reexamination Request No. 90/001,571, Aug. 2, 1988.
Reexamination Certificate for Patent No. 4,703,336, issued Oct. 27, 1987, Ser. No. 853,264, Apr. 17, 1986.
Continuation of Ser. No. 710,359, Apr. 18, 1985, which is a continuation-in-part of Ser. No. 540,153, Oct. 7, 1983, Pat. No. 4,529,380, which is a continuation of Ser. No. 427,688, Sep. 29, 1982, Pat. No. 4,409,605, which is a continuation of Ser. No. 222,489, Jan. 5, 1981, abandoned, which is a continuation of Ser. No. 104,284, Dec. 17, 1979, abandoned, which is a division of Ser. No. 887,353, Mar. 16, 1978, Pat. No. 4,226,898.
The portion of the term of this patent subsequent to Oct. 11, 2000, has been disclaimed.
Int. Cl.[4] H01L *27/14*
U.S. Cl. 357—30



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 17–20 are cancelled.

Claim 1 is determined to be patentable as amended.

Claims 2–16, dependent on an amended claim, are determined to be patentable.

New claims 21–52 are added and determined to be patentable.

1. A photodetection device comprising: means responsive to the intensity of incident radiation for providing a corresponding output signal, said responsive means including a thin semiconductor film comprising a solid [amorphous silicon or] amorphous germanium host matrix having electronic configurations with an energy gap; said host matrix of the amorphous [semiconductor] *germanium* material further including at least one compensating element for reducing the density of localized states in said energy gap.

REISSUES

JANUARY 16, 1990

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 33,146

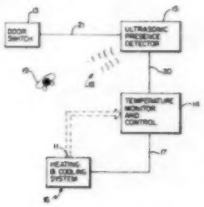
OCCUPANCY RESPONSIVE TEMPERATURE CONTROL SYSTEM

Edwin A. Carrell, Georgetown, and David H. Spivey, Austin, both of Tex., assignors to Flair International Corporation, Hauppauge, N.Y.

Original No. 4,485,864, dated Dec. 4, 1984, Ser. No. 225,101, Jan. 14, 1981. Application for reissue Dec. 2, 1986, Ser. No. 937,018

Int. Cl.[4] G05D *23/00*; H01H *3/16*

U.S. Cl. 165—11.1 **14 Claims**



6. A method of operating a system for modifying the temperature of an enclosed space having at least one access portal, the system including temperature means for changing the temperature of the air in the space and regulating means responsive to the temperature within the space for producing a command signal to said temperature means causing heat to be supplied to or withdrawn from the space when the temperature therein departs from a first control range; the method comprising the steps of:

detecting absence or presence of a body within the space;

detecting the opening or closing of the access portal;

initiating a predetermined interval of time in response to the opening or closing of the access portal;

deactivating the regulating means when no presence of a body is detected during said predetermined interval of time; and

maintaining active the regulating means, once the presence of a body is detected during said predetermined interval of time, even when no body presence detected outside said predetermined interval.

Re. 33,147

CEILING FAN MOUNTING ASSEMBLY

Kenneth H. Reiker, 22 Lakeshore Dr., Shalimar, Fla. 32579

Original No. 4,684,092, dated Aug. 4, 1987, Ser. No. 785,405, Oct. 8, 1985. Application for reissue Aug. 8, 1988, Ser. No. 229,438

Int. Cl.[4] F24F *7/06*

U.S. Cl. 248—200.1 **37 Claims**

17. A ceiling fan mounting assembly providing high load capability, and vibration and torque resistance for an electrical ceiling fan support housing connected with a joist structure adjacent an opening in the ceiling, the assembly comprising:

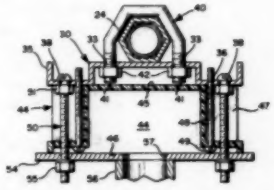
(a) means for engaging the joist structure adjacent the ceiling opening and for providing a firm, torque resistant support structure above the ceiling opening;

(b) an electrical junction box having a relatively flat upper surface and side wall structure with a lower peripheral surface, said junction box in firm engagement with said joist engaging means for providing vibration and torque resistance;

(c) two widely spaced support elements operably associated with said box and extending downwardly therefrom substantially parallel to said side wall structure and terminating substantially below said peripheral surface;

(d) a ceiling fan supporting housing having a structural member disposed below and in firm engagement with said junction box lower peripheral surface, said structural member having a pair of widely spaced openings therein;

(e) said support elements extending through said openings and



having an upper portion disposed above said upper surface; and,

(f) fastening means are mounted on the terminal end of each support element for maintaining said supporting housing structural member in firm engagement with said peripheral surface and for thereby providing vibration and torque resistance.

Re. 33,148

STRUT TYPE SUSPENSION FOR AUTOMOBILE

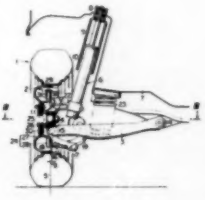
Mamoru Sakata, Ooizumigakuen, and Masaaki Minakawa, Tokyo, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Original No. 4,620,720, dated Nov. 4, 1986, Ser. No. 822,938, Jan. 27, 1986. Continuation of Ser. No. 576,307, Feb. 2, 1984, abandoned. Application for reissue Mar. 3, 1988, Ser. No. 163,918

Claims priority, application Japan, Feb. 2, 1983, 58-15923; Feb. 2, 1983, 58-15924

Int. Cl.[4] B60G *3/02*

U.S. Cl. 280—666 **10 Claims**



1. A strut type suspension for automobiles having a chassis, comprising a support member for rotably supporting a wheel, a lower control arm extending in the widthwise direction of the chassis and connected pivotably at its outer *end to said support member, a radius rod having one and other* ends and extending substantially in a longitudinal direction of said chassis with the one end thereof pivotably connected to the chassis, and a brake unit in said wheel, said brake unit being in a central portion of said wheel with a recess opened to an inner side of said chassis, said support member having an integral member extending inwardly and downwardly of said chassis and connected with the other end of said radius rod, the outer end of said lower control arm pivoted to the support member extending into said recess so that said pivot is located close to the center line contact of said wheel with the ground.

Re. 33,149

FINELY PARTICULATED COLLOIDAL PLATINUM COMPOUND AND SOL FOR PRODUCING THE SAME AND METHOD OF PREPARATION OF FUEL CELL ELECTRODES AND THE LIKE EMPLOYING THE SAME

Henry G. Petrow, Watertown, and Robert J. Allen, Saugus, both of Mass., assignors to Prototech Company, Newton Highlands, Mass.

Original No. 4,044,193, dated Aug. 23, 1977, Ser. No. 534,731, Dec. 20, 1974. Continuation-in-part of Ser. No. 153,824, Jun. 16, 1971, abandoned, which is a continuation of Ser. No. 430,190, Dec. 28, 1973, abandoned. Application for reissue Dec. 28, 1981, Ser. No. 335,201

Int. Cl.[4] H01M *4/92*

U.S. Cl. 429—40 **38 Claims**

1. In a fuel cell [and the like], a catalytic electrode comprising an electrically conductive high surface area *carbon* substrate on which has been deposited platinum particles of the order of substantially 15 to 25 Angstroms in particle size and in which said particles are formed from [one of] an oxidative decomposition of a platinum *sulfite* complex comprising an oxidizable ligand [, and hydrolysis of a non-complex platinum salt solution].

35. A fuel cell comprising a catalytic electrode having an electrically conductive high surface area carbon substrate on which has been deposited platinum particles of the order of substantially 15 to 25 Angstroms in particle size, with the average particle size being in that range, and formed from a complex platinum sulfite having substantially the composition of $H_3Pt(SO_3)_2OH$.

PLANT PATENTS

GRANTED JANUARY 16, 1990

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,106
APPLE TREE
Kunio Hatakoshi, Matsumoto, Japan, assignor to Komachien Co., Ltd., Nagano, Japan
Filed Mar. 18, 1988, Ser. No. 170,966
Claims priority, application Japan, Jun. 22, 1987, 2356
Int. Cl.[4] A01H 5/00
U.S. Cl. Plt.—34 1 Claim

1. A new and distinct variety of apple tree, substantially as illustrated and described herein, characterized over known apple trees by (A) having a moderate vigor and a good spur-bearing habit, and (B) producing a medium size fruit having an oval shape (a) maturing early in the season and earlier than 'Tsugaru', and (b) having (1) a superior keeping quality for a cultivar maturing earlier than 'Tsugaru', (2) a conspicuous appearance caused by a relief of dense and large dots against a solid deep red coloured surface, which overlays a yellowish green ground colour skin, if not bagged, and (3) a yellowish white flesh which is moderately juicy, crisp and hard, has a moderate sweetness, a relatively strong acidity, and an aromatic flavor, and gives a good sweet-acid balance and an excellent dessert quality.

7,107
GERANIUM NAMED KLEDOL
Siegfried Klemm, Hanfacker 8, D-7000 Stuttgart 50, Fed. Rep. of Germany
Filed Sep. 15, 1988, Ser. No. 244,999
Int. Cl.[4] A01H 5/00
U.S. Cl. Plt.—68 1 Claim

1. The new and distinctive geranium plant substantially as herein shown and described, particularly distinguished by its clear red-purple flowers, of which the individual florets have a distinctive white eye.

7,108
AFRICAN VIOLET PLANT NAMED LITTLE BLUE TOPAZ
Reinhold Holtkamp, Sr., Werther Strasse 112, D4294 Isselburg, Fed. Rep. of Germany
Filed Feb. 15, 1989, Ser. No. 310,757
Int. Cl.[4] A01H 5/00
U.S. Cl. Plt.—69 1 Claim

1. A new and distinct cultivar of African violet named Little Blue Topaz, as described and illustrated, and particularly characterized by its miniature growth habit; purplish blue, single violet-shaped flowers; strong stems which curve toward the center to form a compact bouquet above the leaves; profuse and continuous flowering; medium green, spear-shaped leaves; flowering 10–11 weeks after planting of unrooted shoot, and by its long lasting and non-dropping flowers.

7,109
AFRICAN VIOLET PLANT NAMED IMPROVED TEXAS
Reinhold Holtkamp, Sr., Werther Strasse 112, D4294 Isselburg, Fed. Rep. of Germany
Filed Feb. 15, 1989, Ser. No. 310,759
Int. Cl.[4] A01H 5/00
U.S. Cl. Plt.—69 1 Claim

1. A new and distinct cultivar of African violet named Improved Texas, as described and illustrated, and particularly characterized by its single violet-shaped, blue flowers with frilled edges and somewhat darker center; strong, upright flower stems that curve slightly toward the center to form a compact bouquet above the leaves; relatively dark green, oval to heart-shaped leaves; profuse flowering, vigorous and compact growth habit, flowering 10–11 weeks after potting, and its long lasting and non-dropping flowers.

7,110
AFRICAN VIOLET PLANT NAMED SCORPIO
Reinhold Holtkamp, Sr., Werther Strasse 112, D4294 Isselburg, Fed. Rep. of Germany
Filed Feb. 15, 1989, Ser. No. 310,760
Int. Cl.[4] A01H 5/00
U.S. Cl. Plt.—69 1 Claim

1. A new and distinct cultivar of African violet named Scorpio, as described and illustrated, and particularly characterized by its single, lilac flowers with darker center radiating into the 2 small petals; strong, upright flower stems that curve toward the center to form a compact bouquet above the leaves; bright green, slightly serrated girl-type leaves; profuse flowering, vigorous growth habit, flowering 10–11 weeks after potting, and its long lasting and non-dropping flowers.

7,111
CARNATION NAMED KLEFICARO
Siegfried Klemm, Hanfacker 8, D-7000 Stuttgart 50, Fed. Rep. of Germany
Filed Oct. 3, 1988, Ser. No. 252,593
Int. Cl.[4] A01H 5/00
U.S. Cl. Plt.—70 1 Claim

1. The new carnation plant, substantially as herein shown and described, characterized by being a fast growing miniature variety having an average plant height of about 60 cm. producing medium sized flowers of a light orange color having red petal markings growing on strong stems having a moderate amount of medium broad, green-blue leaves.

7,112
CARNATION NAMED BIANCA
Jan J. Hilverda, Aalsmeer, Netherlands, assignor to Hilverda b.v., Aalsmeer, Netherlands
Filed Jan. 23, 1989, Ser. No. 299,757
Int. Cl.[4] A01H 5/00
U.S. Cl. Plt.—70 1 Claim

1. The new and distinct spray carnation variety, substantially as herein shown and described, characterized by its medium sized flowers of substantially pure white color, its profuse production of blooms carried on a long flower stem, and its vigorous and upright growth habit with abundant foliage.

7,113
CARNATION NAMED HILSWISS
Jan J. Hilverda, Aalsmeer, Netherlands, assignor to Hilverda b.v., Aalsmeer, Netherlands
Filed Feb. 10, 1989, Ser. No. 308,757
Int. Cl.[4] A01H 5/00
U.S. Cl. Plt.—70 1 Claim

1. The new and distinct spray carnation variety, substantially as herein shown and described, characterized by its relatively small flowers having basically white petals, red picotee along its marginal edges and red marginal stripes, its continuous and profuse blooming habit with the flowers carried on a long flower stem, and its vigorous and upright growth habit with abundant foliage.

7,114

CARNATION NAMED HILSHOW

Jan J. Hilverda, 12 Stommeerweg, Aalsmeer, Netherlands

Filed Feb. 10, 1989, Ser. No. 308,647
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—71 1 Claim

1. A new and distinct spray carnation variety, substantially as herein shown and described, characterized by its very small, generally pink flowers borne in clusters on a strong stem from a plant of very short height and particularly adaptable to pot plant culture.

7,115

CARNATION NAMED HILBIRD

Jan J. Hilverda, Aalsmeer, Netherlands, assignor to Hilverda b.v., Aalsmeer, Netherlands

Filed Feb. 10, 1989, Ser. No. 308,752
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—71 1 Claim

1. The new and distinct spray carnation variety, substantially as herein shown and described, characterized by its relatively small flowers having an overall lavender-lilac coloration, its profuse production of blooms carried on a long flower stem, and its vigorous and upright growth habit with abundant foliage.

PATENTS

GRANTED JAN. 16, 1990

ERRATA

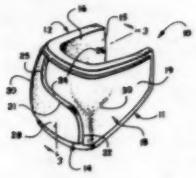
For CLASS	See PATENT NO.
528-208	4,893,443
606-054	4,893,618
606-087	4,893,619
606-127	4,893,621
227-180	4,893,622
544-331	4,894,460
346-076	4,894,712
360-006	4,894,728
174-035	4,894,740
371-022	4,894,800

PATENTS

GRANTED JANUARY 16, 1990

GENERAL AND MECHANICAL

4,893,355
KNEE PROTECTOR
William H. Ritter, 3644 Southern Blvd., Birmingham, Ala. 35242
Filed Aug. 8, 1988, Ser. No. 229,273
Int. Cl.[4] A41D *13/00*
U.S. Cl. 2—24 **5 Claims**



1. A knee protector for shielding a knee against blows, said knee having a kneecap on the front thereof, an inside surface on one side of said knee and an outside surface on the opposite side of said knee, said knee protector comprising padding means consisting of flexible padding material carrying protecting means of generally rigid material, said knee protector further including an inside portion for at least partially covering said inside surface and said knee, and an outside portion generally parallel to said inside portion and spaced therefrom for at least partially covering said outside surface of said knee, and a front portion connecting said inside portion and said outside portion and covering said kneecap, said protecting means defining a line of articulation for providing a first section of said protecting means and a second section of said protecting means, said line of articulation defining on said front portion on upper lobe of said protecting means and a lower lobe of said protecting means, and first section of said protecting means being generally coextensive with said inside portion of said knee protector and integral with one of said lobes of said protecting means, said second section of said protecting means being generally coextensive with said outside portion of said knee protector and integral with the other of said lobes of said protecting means.

4,893,356
AIR CONDITIONED HEADWEAR HAVING CONVERTIBLE POWER MODULE
William A. Waters, 3648 East 49th St., Tulsa, Okla. 74135-3102
Filed Sep. 22, 1987, Ser. No. 99,791
Int. Cl.[4] A42C *5/04*
U.S. Cl. 2—171.3 **48 Claims**

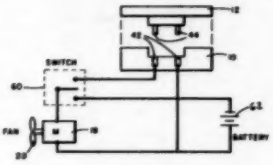
1. Headwear of the type covering at least a portion of a wearer's head and, having means to circulate air upon another portion of said wearer's head said means comprising

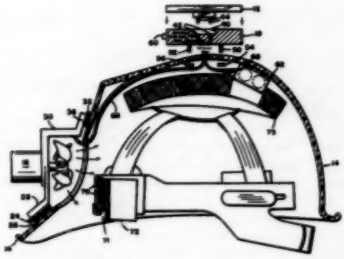
an opening through said covering of said headwear.

an electric motor driven air moving means positioned contiguously of said at least one opening,

a first self-contained power means attached to said headwear and connected to said electric motor,

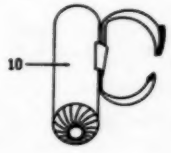
a power module attached to said headwear, said module having means to removably receive an alternate self-contained power source,





switch means to selectively connect or disconnect said first power means or said alternate power source with said electric motor.

4,893,357
REVERSIBLE HAND WARMING MUFF
Keith O. Evans, 12296 W. Bay Sh. Dr., Traverse City, Mich. 49684
Filed Feb. 22, 1988, Ser. No. 158,553
Int. Cl.[4] A41D *13/08, 19/00*
U.S. Cl. 2—208 **6 Claims**



1. A combination reversible hand warming muff with a belt comprising:

(a) A cylindrical tube having two distal open ends and inner and outer surfaces or layers:

(b) A cylindrical cuffs sewn to each of said open ends of said tube:

(c) A rectangular longitudinal strip, each sewn intermediate to the said open ends, along the inner and outer surfaces, in a lengthwise direction on the said tube, to provide a double open ended belt channel having inner open edges, thru which a reversible muff belt can pass.

4,893,358

GARMENTS HAVING AN ADJUSTABLE WAIST

Lorin L. Bice, Jr., 3335 Harding St., Long Beach, Calif. 90805

Filed Nov. 14, 1988, Ser. No. 270,781
Int. Cl.[4] A41D *1/06, 1/14*
U.S. Cl. 2—221 **2 Claims**

1. In a garment having a waist portion, a waist adjustment comprising:

at least one foldable member formed from an excess portion of said waist portion folded back upon itself to form two layers secured each to the other, said excess portion being foldable onto the remainder of said waist portion in contiguous engagement therewith;

means on said foldable member and said remainder of said waist portion for selectively affixing one to the other at different relative positions, the relative positions of affixing determining the adjusted size of said garment waist portion, said affixing means comprising a pair of complementary hook and loop fastening elements, a first of said pair of fastening elements being secured to said foldable member and a second of said pair of said fastening elements being secured to said waist portion, said second element having a greater length dimension than said first element, whereby said relative positions of said first and second elements may be selectively affixed at any one of a plurality of non-discrete locations along said length dimension of said second element; and,

means for coupling said first fastening element to said foldable member, said coupling means securing said two layers of said foldable member each to the other while simultaneously securing said first fastening element thereto.

4,893,359

VENTED TOILET BOWL

Phuc N. Vu, 4451 Janssen Dr., Memphis, Tenn. 38128, and George Spector, 233 Broadway, Rm 3815, New York, N.Y. 10007

Filed Feb. 17, 1989, Ser. No. 311,742
Int. Cl.[4] E03D *9/05*
U.S. Cl. 4—216 **7 Claims**

1. An odor eliminator system for a toilet bowl which comprises:

an elongated conduit extending through an aperture in a rear portion of the toilet bowl above the bowl water and upwardly into a bathroom wall;

an exhaust fan built into the bathroom wall and connected to a distant end of said conduit;

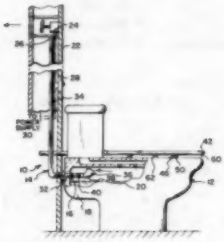
a switch electrically connected between said exhaust fan and a power supply to that when said switch is closed said exhaust fan will be activated for drawing gaseous odors away from the toilet bowl and out into the ambient atmosphere;

wherein said elongated conduit includes:

a fitting disposed into the aperture in the rear portion of the toilet bowl;

a pipe extending from one side of said fitting to said exhaust fan;

an outlet port member extending from the opposite side of said fitting into said toilet bowl, said outlet port member curving upwardly at a free end thereof and having a drain hole therein; and



a normally closed one way check valve built into said outlet port member to generally prevent some of the agitated water within the toilet bowl from entering said pipe, whereby said check valve will only open when said exhaust fan is activated.

4,893,360

APPARATUS FOR POSITIONING A SEAT ON THE RIM OF A TOILET BOWL

Barry Wofford, 1102 Parkside Blvd., Toledo, Ohio 43607

Filed Jan. 30, 1989, Ser. No. 303,759
Int. Cl.[4] A47K *13/00*
U.S. Cl. 4—237 **11 Claims**

1. For use with a toilet having a bowl defining a rim having an upper surface, and a seat pivotably attached to the bowl, the seat having a lower surface and being movable to a lowered position wherein the lower surface of the seat rests upon the upper surface of the rim, an apparatus for positioning the seat relative to the rim comprising:

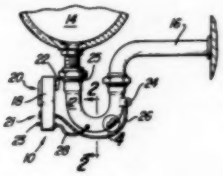
a first positioning member;

means for attaching said first positioning member to the upper surface of the rim;

a second positioning member; and

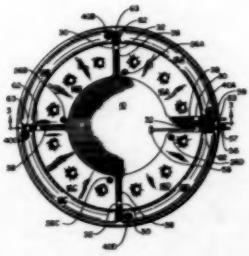
means for attaching said second positioning member to the lower surface of the seat, said first and second positioning members being aligned such that they are cooperable when the seat is in the lowered position so as to prevent lateral movement of the seat relative to the rim.

4,893,361
DRAIN TRAP ULTRASONIC VIBRATION CLEANING APPARATUS
Paul H. Burns, 394 W. Webster, Ferndale, Mich. 48220
Filed Dec. 22, 1987, Ser. No. 136,386
Int. Cl.[4] E03C 1/30
U.S. Cl. 4—255 13 Claims



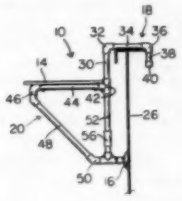
1. A drain trap cleaning apparatus comprising:
a drain trap body interconnectable with a plumbing system;
one or more transducers fitted within said drain trap body;
said transducers being configured and situated to minimally interfere with the flowthrough of material through said drain trap body;
a flow sensor fixed to said drain trap body;
an electrical signal generator including actuating means selectively operable when said system is in use and electrically interconnected with said transducers and said flow sensor so that said sensor is capable of signalling said electrical signal generator in response to a low fluid flow rate through said system when in use to send electrical signals to said transducers; and
said transducers being capable of producing vibrations.

4,893,362
PORTABLE SPA
Pierce M. Murphy, N 1189 Continental La., LaCross, Wis. 54601
Filed Apr. 1, 1988, Ser. No. 176,646
Int. Cl.[4] E04H 3/18
U.S. Cl. 4—493 19 Claims



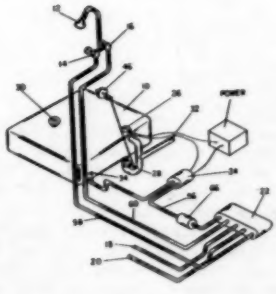
2. A fluid containing portable spa comprising
(a) a vertically, circumferentially rigid, upstanding side wall having an open cylindrical configuration;
(b) a flexible liner disposed over and within said side wall and including a plurality of inflatable seat chambers disposed on the bottom of said liner and a plurality of inflatable backrest chambers disposed peripherally around the upper interior thereof, each of said seat and backrest chambers having selectively operable access valve means disposed on upper and lower portions, thereof and each of said seat chambers having interconnecting selectively operable valve means disposed adjacent the side portions thereof.

4,893,363
HANGING WALL TABLE FOR SWIMMING POOLS
Harold E. Huff, 7 Edwards La., Belleville, Ill. 62223
Filed Sep. 21, 1988, Ser. No. 247,174
Int. Cl.[4] E04H 3/18
U.S. Cl. 4—496 4 Claims



1. A hanging table for support upon a side wall of an above the ground swimming pool which comprises a tubular frame consisting of at least two hanging J-shaped support members adapted to fit over a top of the pool side wall, at least two triangular support bases coplanar with and oriented below said hanging support members, a vertical leg member forming a vertical leg of said triangular base and extending therefrom to form a vertical leg portion of said J-shaped support member in each of said triangular bases and support members, a horizontally extending brace member being fixed to a bottom portion of each of said triangular bases to connect said bases together in rigid relationship, a table shelf which is secured upon top edges of said triangular support bases, and suction cups attached to said triangular bases to engage the side wall from which said frame is supported, and said frame being comprised of polyvinyl chloride tubing and fittings which may be easily assembled from a kit.

4,893,364
WATER-RECYCLING SHOWER
Francis R. Keeler, 505 Great Plain Ave., Needham, Mass. 02192
Filed May 23, 1988, Ser. No. 197,586
Int. Cl.[4] A47K 4/00
U.S. Cl. 4—597 3 Claims



1. A shower of the type providing hot and cold water inlets receiving water from hot and cold fresh water sources to a shower head disposed within a shower area having a floor upon which the user stands, said floor having a water shower drain therein, comprising:
a water storage tank disposed to receive water from said water shower drain;

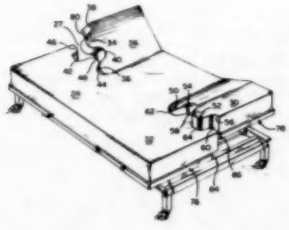
a tank drain defined in said water storage tank;
a recycle water outlet defined at the bottom of said water storage tank;
a recycle water pipe having a first and second end, said first end connected to said recycle water outlet;
means to sense when said water storage tank contains a predetermined amount of water therein;
a pump positioned in line on said recycle water pipe;
means to activate said pump, said means controlled by said means to sense a predetermined amount of water in said water storage tank; and
means to direct water flow to said hot and cold water inlets of said shower, said means including means to receive water from said water storage tank pumped through said second end of said recycle water pipe and to direct such water to said hot and cold water inlets of said shower head while at the same time ceasing flow of hot and cold water from said fresh water sources, said means to direct water flow controlled by water pressure from said recycle water pipe such that in a first mode when no water pressure is in said water recycle pipe, fresh water reaches said shower head and in a second mode when pressure is present in said water recycle pipe, said pressure causes said means to direct water flow to enter a second mode and cease the flow of fresh hot and cold water from its fresh water sources and to then direct the water from said water storage tank to said hot and cold water inlets of said shower head.

4,893,365

ADJUSTABLE KING-SIZED MATTRESS

Donald R. Justice, P.O. Box 458, Matlacha, Fla. 33909

Filed May 22, 1989, Ser. No. 354,769
Int. Cl.[4] A61G 7/00
U.S. Cl. 5—68 **7 Claims**



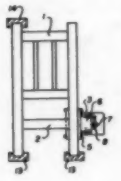
5. A bed comprising:
a bed frame,
a mattress located on said bed frame, said mattress including a head end, a foot end and a central portion located between said head end and said foot end, said head end including a centrally-located head end separation for dividing said head end into two head portions, said head end separation extending from said head end towards said foot end and terminating at said central portion, said separation extending in a serpentine pattern to form a series of complementary-shaped crests and valleys on said two head portions,
said foot end including a centrally-located foot end separation for dividing said foot end into two foot portions, said foot end separation extending from said foot end towards said head end and terminating at said central portion, said separation extending in a serpentine pattern to form a series of complementary-shaped crests and valleys on said two foot portions.

4,893,366

CRIB WITH VIBRATION ATTENUATING MEANS

Karl G. Rosén, Karantänsgatan 13, S 442 35 Kungälv, Sweden

Continuation-in-part of Ser. No. 889,933, Jul. 17, 1986, abandoned. This application Mar. 1, 1988, Ser. No. 162,693
Claims priority, application Sweden, Dec. 10, 1984, 8406250
Int. Cl.[4] A47D 9/02
U.S. Cl. 5—109 **3 Claims**



1. A crib comprising a plurality of generally vertical corner posts, a vibrating device attached to said crib comprising a housing and a motor having an eccentric weight mounted on a shaft driven by said motor so as to produce vibrations upon actuation of said motor, the frequency of said vibrations being within the range 800–2000 vibrations per minute, sound generating means attached to said crib, said sound generating means including volume and frequency control means, and vibration attenuating means located at the lower ends of said posts and at the upper ends of at least some of the posts, whereby the transmission of vibrations to the floor supporting the posts and the walls contacting the posts, will be attenuated.

4,893,367

SYSTEM OF SEPARATELY ADJUSTABLE PILLOWS

Bent Heimreid, Ovre Maihaugen 4B, N-3700 Skien, and Finn Risung, Borgekroken 31, 3900 Porsgrunn, both of Norway

Filed Jan. 17, 1989, Ser. No. 297,427
Claims priority, application Norway, Jan. 18, 1988, 880185
Int. Cl.[4] A47C 27/10
U.S. Cl. 5—431 **1 Claim**

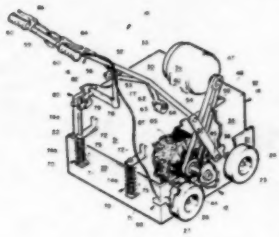
1. A system of separately adjustable pillows, comprising:
a plurality of inflatable pillows, each of which is subject to being moved about in relation to a person's body substantially independently of all others of said pillows;
each pillow being subject to being inflated with a fluid to a desired extent, having, when less inflated, a smaller volume and a softer feel and having, when more inflated, a larger volume and a harder feel; and
a means for inflating each pillow, comprising:
a manifold for receiving a supply of pressurized fluid;
a valve for each pillow, said valves being operatively connected with the manifold for receiving pressurized fluid therefrom; and
an inflation tube connecting each valve with a respective pillow, for selectively supplying said pillows with pressurized fluid under control of said valves, at least some of the inflation tubes being of a sufficient length to permit the positioning of pillows in supporting relation to a person's head and feet.

4,893,368

DRIVEWAY SCRUBBER

Justin Ward, 895 Alveda Ave., El Cajon, Calif. 92019

Filed Nov. 18, 1988, Ser. No. 272,917
Int. Cl.[4] E01H 1/05
U.S. Cl. 15—79 A **7 Claims**



1. A power driven driveway scrubbing apparatus comprising:

an outer base housing having a rear wall with laterally spaced side structural members extending forwardly from its opposite ends, a front axle extending laterally through and extending outwardly from each of said respective side walls, front wheels mounted on opposite ends of said front axle, a pair of rear wheels each of which is mounted on its own separate axle that extends outwardly from said respective side structural members;

an inner base housing having a top wall, a front wall, a rear wall, and laterally spaced side walls, said inner base housing being physically located within said outer base housing, said front axle being journaled in apertures in the respective side walls of said inner base housing so that the inner base housing may be pivoted about said front axle;

a cylindrically shaped brush located within said inner base housing and being mounted on a first shaft member having its opposite ends secured to the respective lateral side walls of said inner base housing;

a motor and means for transmitting rotational motion therefrom to said brush means;

a push handle assembly having means pivotally attaching its lower end to said outer base housing;

means to bias the inner base housing vertically with respect to said outer base housing; and

means connected to said push handle assembly for rotating the rear end of said inner base housing downwardly about said front axle thereby causing said cylindrically shaped brush to be forced into scrubbing contact with the surface upon which said scrubbing apparatus is traveling over.

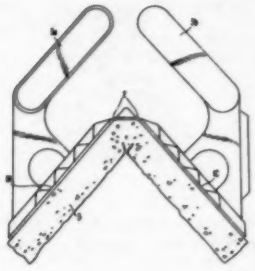
4,893,369

HAND-HELD UTENSIL FOR SURFACE CLEANING, MOPPING AND THE LIKE

Bryan Johnson, Beauvais, France, assignor to Spontex Incorporated, New Rochelle, N.Y.

Filed May 20, 1988, Ser. No. 196,266
Int. Cl.[4] A47L 13/12
U.S. Cl. 15—119 A **19 Claims**

1. A hand-held utensil for surface cleaning, mopping and the like, comprising a pad of surface-treatment material, and a holder for the pad, the holder comprising parts which are movable relative to one another from a first working position in which the pad is used in normal use of the utensil to a second position in which the parts squeeze the pad, the holder parts having respective handles adapted to be directly gripped by the user and to enable the user to move the parts from the first working position to the second position, and wherein the handles, in the first working position of the holder parts, cooperate to form a handle arrangement extending along the holder which serves as a grip to enable the user to hold the utensil.

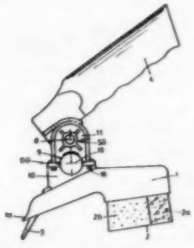


4,893,370

HAND TOOL FOR CLEANING SMOOTH SURFACES, IN PARTICULAR PANES OF GLASS

Manfred Klotz, Friedrich-List-Str. 25, 4790 Paderborn, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 60,570, Oct. 3, 1987. This application Jun. 7, 1988, Ser. No. 203,191
Claims priority, application Fed. Rep. of Germany, Oct. 7, 1986, 8627272; Jul. 16, 1987, 8709764
Int. Cl.[4] A47L 13/14
U.S. Cl. 15—121 **26 Claims**



1. A hand tool for cleaning smooth surfaces, in particular panes of glass, comprising a flat-box-shaped holder; receiving a sponge block received in said holder; a squeegee spaced apart from said sponge block and parallel to it; a handle being disposed on said holder in a manner swivelable in terms of inclination and laterally about a vertical lateral swivel axis, and an inclination-adjusting axis extending parallel to said holder; two joints (SG, DG) disposed one above the other; and a common locking and unlocking element for locking both of said joints in a particular handle position including a slide provided to be displaceable parallel to the inclination-adjusting axis and swivelable with the lateral swivel axis is located between the two axes disposed spaced apart one above the other.

4,893,371

SCOURING PAD

Hans J. Hartmann, P.O. Box 2026, Woonsocket, R.I. 02895

Filed Jul. 25, 1988, Ser. No. 223,405
Int. Cl.[4] A47L 13/07
U.S. Cl. 15—209 B **3 Claims**

1. A scouring pad comprising a porous, resilient toroidal

.core having a central opening, a tubular knitted metallic ribbon mesh located in the central opening with its ends folded back

over the core to form two plies over the core and with the last folded and tucked into the opening at the opposite side of the core.

4,893,372

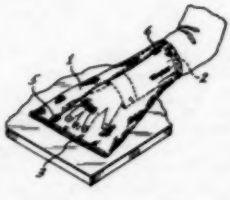
FREE-HAND TOWEL

Ronald E. Wenzel, Seattle, Wash., assignor to Myron H. Berg, Seattle, Wash., a part interest

Filed Sep. 16, 1988, Ser. No. 246,120

Int. Cl.[4] A47L *13/18*

U.S. Cl. 15—227 2 Claims



1. A free-hand tubular towel comprising a tubular body flaring from an upper constricted end portion toward a lower enlarged wiping end portion, an elastic band carried by the upper end portion of said tubular body for encircling and gripping the arm of a wearer above or slightly below the elbow with the lower enlarged wiping end portion of said tubular body dangling loosely over the hand, one component of a hook-and-pile fastener being carried by the upper end portion of said tubular body and a second component of a hook-and-pile fastener being carried by the lower end portion of said tubular body at locations adapted for fastening engagement of the two fastener components when the lower end portion of said tubular body is reverse-folded over the upper end portion of said tubular body.

4,893,373

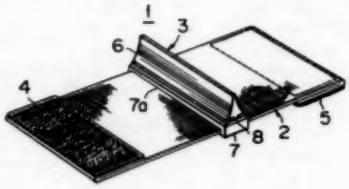
MANUAL WIPER

Makoto Kato, Tokyo, Japan, assignor to Yugen Kaisha Ads. Planning, Tokyo, Japan

Filed Nov. 14, 1988, Ser. No. 270,257

Int. Cl.[4] A47L *25/00*

U.S. Cl. 15—245 3 Claims



1. A manual wiper comprising:

an elastic base elongated adopted to be detachably wound around a finger; and

a wiper blade provided on said base in such a manner as to traverse the same and whose position is adjustable on said base.

4,893,374

WINDSHIELD WIPER SYSTEM

Herbert Bienert, Besigheim, and Bernd Walther, Bietigheim-Bissingen, both of Fed. Rep. of Germany, assignors to SWF Auto-Electric GmbH, Bietigheim-Bissingen, Fed. Rep. of Germany

Filed Jun. 27, 1986, Ser. No. 879,291

Claims priority, application Fed. Rep. of Germany, Jun. 29, 1985, 3523441

Int. Cl.[4] B60S *1/52*

U.S. Cl. 15—250.04 16 Claims

1. A windshield wiper system comprising:

a fastening member for attachment to a wiper arm member, said fastening member being fixed onto a wiper shaft;

a cap swivellably articulated onto said fastening member, said cap having an operating position wherein it covers the connection between said wiper shaft and said fastening member, said cap being pivotable from said operating position;

a washing liquid channel extending within said wiper shaft;

said cap having a bore through which said channel extends, said bore being larger than the outside diameter of said channel in the area of said bore to permit said cap to pass over said channel when said cap is articulated onto said fastening member; and

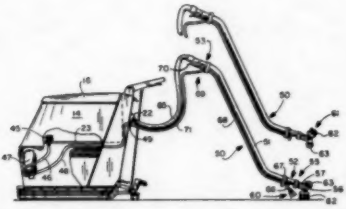
a nozzle in fluid communication with said liquid channel, said nozzle being disposed on a side of said cap which is opposite said fastening member when said cap is in said operating position.

4,893,375

DUAL MODE FLOOR SCRUBBING MACHINE

Richard L. Girman, Glen Ellyn; Gary E. Palmer, Roselle, and Gust G. Gotsis, Naperville, all of Ill., assignors to Hako Minuteman, Inc., Addison and Restaurant Technology, Inc., Oak Brook, both of, Ill.

Filed Mar. 17, 1989, Ser. No. 325,559
Int. Cl.[4] A47L *7/00*
U.S. Cl. 15—321 **5 Claims**



1. Floor scrubbing apparatus for use either as a walk-behind scrubber or as a manually-operated scrubber comprising: a chassis having support wheels; a rotary brush carried by said chassis in a position to scrub a floor; a first motor for driving said rotary brush; first dispensing means for dispensing cleaning solution on said floor to be worked by said rotary brush; vacuum recovery means including a recovery reservoir, vacuum motor means for generating a vacuum in said reservoir, and pick-up means behind said rotary brush for recovering spent solution worked by said rotary brush in cleaning said floor and for delivering said spent solution to said recovery reservoir; and a manually-operated scrub and recovery device adapted for selective connection to said apparatus and comprising a hand-held wand adapted for maneuvering by an operator and including an elongated rigid vacuum tube having one end connectable to said recovery reservoir thereby to draw in air and solution through the other end thereof, second dispensing means for dispensing cleaning solution under pressure on said floor under manual control of said operator at a location adjacent said other end of said rigid vacuum tube, and convertible means coupled to said other end of said rigid vacuum tube for movement between first and second use positions, said convertible means including a second brush and a second vacuum recovery means communicating with said rigid vacuum tube, whereby said operator may use said apparatus without said scrub and recovery device as a walk behind floor scrubbing machine or said operator may attach said scrub and recovery device to said apparatus, dispense cleaning solution under pressure on the floor adjacent said convertible means and use said second brush in said first use position to work said solution onto said floor and then move said second vacuum recovery means to recover the spent solution and store the same in said recovery reservoir.

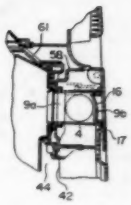
4,893,376

UPRIGHT-TYPE ELECTRIC VACUUM CLEANER

Masao Sunagawa; Kazuhiro Kubota; Yoshitaro Ishii, all of Hitachi, and Susumu Satoh, Takahagi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Division of Ser. No. 908,670, Sep. 17, 1986. This application Dec. 21, 1988, Ser. No. 287,274
Claims priority, application Japan, Sep. 20, 1985, 60-209731; Oct. 4, 1985, 60-220125; Nov. 19, 1985, 60-259347; Nov. 29, 1985, 60-267149; Dec. 13, 1985, 60-278904; Dec. 13, 1985, 60-278906; Jan. 8, 1986, 61-624; Mar. 7, 1986, 61-48345; Mar. 7, 1986, 61-48352; Mar. 7, 1986, 61-48353; Apr. 4, 1986, 61-76568
Int. Cl.[4] A47L *5/32*
U.S. Cl. 15—337 **2 Claims**

1. An upright-type electric vacuum cleaner comprising a main body case having an electrically operated blower chamber, a main body duct, a bag compartment, and a dust filter accommodated in said bag compartment; a suction port body accommodating an electrically driven rotary brush and tiltably supporting said main body case; a T-shaped tubular member means for interconnecting an outlet of said main body duct and an inlet opening of said dust filter, said T-shaped tubular member means having an opening for receiving an optional hose arranged to be open in a direction of a rear surface of said main body case; and an operable cover means for closing said opening, said operable cover means having a curved inside surface configured so as to make dust jump therealong towards said dust filter.

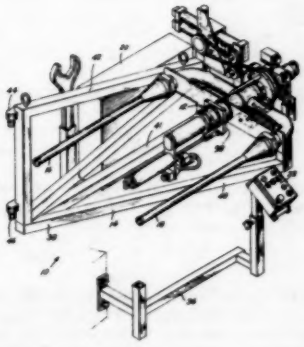


4,893,377

STUFFING HORN TURRET MACHINE

Alfred J. Evans; Raymond H. Misner, both of Raleigh; James A. Gallion, Cary, and Melvin L. Harrod, Raleigh, all of N.C., assignors to Delaware Capital Formation, Inc., Apex, N.C.

Continuation of Ser. No. 144,589, Jan. 6, 1988, abandoned, which is a continuation of Ser. No. 947,628, Dec. 30, 1986, abandoned, which is a continuation-in-part of Ser. No. 821,691, Jan. 23, 1986, abandoned. This application Dec. 13, 1988, Ser. No. 285,325
Int. Cl.[4] A22C *11/02*
U.S. Cl. 17—35 **7 Claims**



1. A turret machine for stuffing horns, the stuffing horns adapted to receive casings having ends, the machine comprising:

a frame structure;

a turret adapted to have mounted thereon at least two of the stuffing horns, the turret being rotatably mounted on the frame structure;

drive means for rotating the turret and thereby the stuffing horns through at least one active rotational position and at least one standby rotational position;

a limit means on the turret assembly for sensing movement

of the ends of a casing on a first of the stuffing horns while the first stuffing horn is in active rotational position;

control means on the machine for causing the drive means to rotate the first stuffing horn away from the active rotational position after the limit means senses movement of the end of the casing on the first stuffing horn and simultaneously causing the drive means to rotate the second stuffing horn to the active rotational position after the limit means senses movement of the end of the casing on the first stuffing horn; and

sensing means for sensing the proper presence or absence of a casing on the second stuffing horn while the second stuffing horn is in the standby rotational position, the control means further being means for causing the drive means to rotate the second stuffing horn to the active rotational position only if the sensing means senses that a casing is properly present on the second stuffing horn.

4,893,378

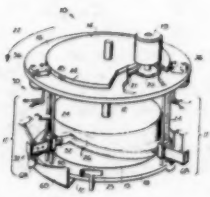
REVOVING POULTRY THIGH DEBONER

Jacobus E. Hazenbroek, and Bastiaan Verrijp, both of Numansdorp, Netherlands, assignors to Systemate Holland B.V., Netherlands

Filed Oct. 31, 1988, Ser. No. 264,890

Int. Cl.[4] A22C *25/16*

U.S. Cl. 17—46 **16 Claims**



1. A method of deboning poultry thighs or the like comprising the steps of:

grasping a thigh bone at a first knuckle,

engaging the thigh adjacent the first knuckle with meat stripper means,

moving the thigh bone and the meat stripper means with respect to each other along the length of the thigh bone until the meat stripper means passes over the other knuckle of the thigh bone and separates the meat from the bone, and

as the thigh bone moves with respect to the meat stripper means, rotating the thigh bone about its length with respect to the stripper means.

4,893,379

TOW STEAMING APPARATUS WITH ADJUSTABLE STEAM CHANNEL CROSS SECTION

Konrad Gilhaus, Bielefeld, Fed. Rep. of Germany, assignor to Spinnereimaschinenfabrik Seydel & Co. GmbH, Bielefeld, Fed. Rep. of Germany

Filed Apr. 22, 1988, Ser. No. 184,972

Claims priority, application Fed. Rep. of Germany, May 19, 1987, 3716690

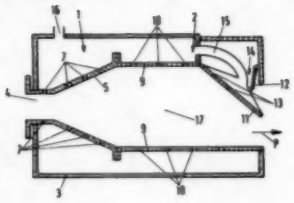
Int. Cl.[4] D01B *9/00*

U.S. Cl. 19—66 T **17 Claims**

1. An apparatus for continuously steaming filament tows or fiber slivers following a stretch-break converting machine, with said apparatus comprising:

a steam channel for receiving saturated steam for steaming filament tows or fiber slivers in said steam channel to release and eliminate shrinkage from said tows or slivers that encounter pressure of movement thereof through the steam channel; and

means for adjusting counterpressure against said filament tows or fiber slivers encountering pressure of movement in said steam channel, said steam channel having an inflow end where filament tows or fiber slivers enter said steam



channel, and an outflow end where said tows or slivers exit said steam channel, with said means for adjusting counterpressure being a flap that is pivotably connected near said outflow end of said steam channel, whereby said flap is adapted to vary the cross-sectional area of said steam channel.

4,893,380

CARD CLOTHING FOR FLATS OF A CARDING MACHINE

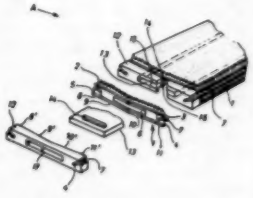
Ralph A. Graf, Freienbach, Switzerland, assignor to Gtsg & Clr. AG, Rapperswil, Switzerland

Filed Mar. 28, 1988, Ser. No. 174,099

Claims priority, application European Pat. Off., Dec. 27, 1987, 87119240.7

Int. Cl.[4] D01G *15/24*

U.S. Cl. 19—114 **4 Claims**



1. A card clothing for flats of a carding machine, said card clothing includes a plurality of mutually abutting saw tooth wire strips, each saw tooth wire strip comprising at least two angularly bent wire strip sections that extend inclined relative to the direction of fibre flow and at least one wire strip section that extends parallel relative to the direction of the fibre flow, and in which the saw tooth wire strips are clampingly supported on an elongated carrier member in a lateral mutually prestressed manner.

4,893,381

BUNDLING STRAP WITH TWO ADJUSTABLE CLOSURES

Eric H. Frankel, 509 N. Genoa Ave., Lubbock, Tex. 79416-3331

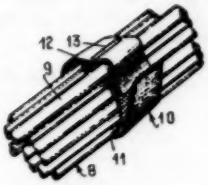
Filed Mar. 9, 1988, Ser. No. 165,974

Int. Cl.[4] B65D *63/00*

U.S. Cl. 24—16 R **3 Claims**

1. A bundling strap which comprises two elongated tape segments aligned generally parallel to each other and means including partially overlapping peel-resistant faces for releasably attaching the tape segments to each other, the two tape

segments being permanently fastened together along a transverse joint, each tape segment having one and only one side thereof covered with a single peel-resistant face, said single peel-resistant face occupying the entire side of the tape segment; the single peel-resistant face of the first tape segment being directed toward the single peel-resistant face of the second tape segment at the transverse joint; the transverse joint being disposed at a first end of the first tape segment and at points between the ends of the second tape segment, the second end of the first tape segment extending longitudinally past a transverse edge disposed at one end of the second tape segment when both tape segments are fully extended longitudinally;



a portion of the peel-resistant face of the first tape segment proximate the transverse joint and a portion of the peel-resistant face of the second tape segment situated between the transverse joint and said transverse edge being adapted to form a first closure; and

a portion of the peel-resistant face on the second end of the first tape segment and a portion of the peel-resistant face of the second tape segment situated between the transverse joint and the end of the second tape segment distal said transverse edge being adapted to form a second closure, so that two closures can be formed simultaneously between portions of the peel-resistant faces.

4,893,382

ARRANGEMENT FOR A FASTENER FOR A STRAINING DEVICE

Lennart Lindblad, Hedasgatan 16, S-447 00 Vargarda, Sweden

Continuation of Ser. No. 88,130, Jul. 23, 1987, abandoned. This application May 4, 1989, Ser. No. 351,329

Claims priority, application Sweden, Nov. 27, 1985, 8505607

Int. Cl.[4] A44B *11/00*

U.S. Cl. 24—200 **4 Claims**

1. A releasable buckle for connecting a pair of straining devices together, comprising a flat metallic plate consisting of a pair of spaced side members interconnected by a pair of parallel clamping stop bars, each of said clamping stop bars having a pair of spaced uprights extending outwardly and joined together by a direction-changing bar, said uprights extending slightly beyond said direction-changing bar to define a pair of stop supports, said spaced side members and said clamping stop bars defining therebetween a space for passage of said pair of straining devices, each of said pair of uprights, said direction-changing bar and said clamping stop bar defining a cavity for passage of a respective straining device therethrough wherein a side of each clamping stop bar facing the cavity is provided with a tongue set outwardly out of said plate in a direction opposite to the adjacent respective pair of uprights, each pair of said uprights being bent outwardly of said plate and over its respective said clamping stop bar, said respective direction-changing bar being bent downwardly from its respective said pair of uprights toward said side members to position said respective stop supports on said side members.

4,893,383

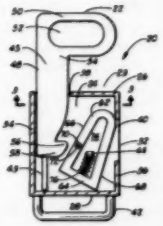
HALTER BUCKLE

Charles C. Quickel, Rte. 1, Box 106C, Sallisaw, Okla. 74955

Continuation-in-part of Ser. No. 181,548, Jul. 27, 1988. This application Feb. 3, 1989, Ser. No. 305,568

Int. Cl.[4] A44B *11/25*

U.S. Cl. 24—647 **11 Claims**



1. A buckle comprising:

a first coupler;

a second coupler, having a cavity therein sized for receiving the first coupler;

a latch for selectively retaining the first coupler within the second coupler, wherein the latch is piv cootally secured to the second

a latch for selectively retaining the first coupler within the second coupler, wherein the latch is pivotally secured to the second coupler for movement between a locking position and an unlocking position;

means for biasing the latch into the locking position;

and means for enclosing the means for biasing within the latch, wherein the means for enclosing the means for biasing is characterized by the latch having an opening therein, and wherein the means for biasing the latch is contained within the opening.

4,893,384

SHOE BUCKLE

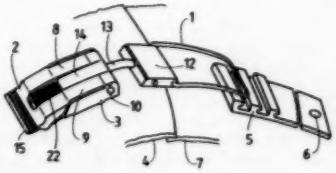
Vancenzo Bidoia, Castelfranco V, and Orelio Mogno, Paese, both of Italy, assignors to Lange International S.A., Switzerland

Filed Feb. 15, 1989, Ser. No. 311,464

Claims priority, application Switzerland, Mar. 31, 1988, 12358/85

Int. Cl.[4] A43C *11/00*

U.S. Cl. 24—68 SK **4 Claims**



1. A shoe buckle comprising a base (3) intended to be fixed onto a shoe part, a tensioning lever (2) with two arms hinged on this base by the ends of its arms, a first hooking member (1) intended to be hooked onto a second hooking member (5) fixed to another part of the shoe, connecting means with an adjust-

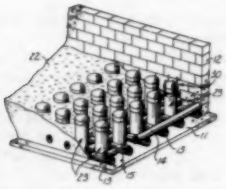
able length between the first hooking means (12) provided with a rod (13) having a threaded part by means of which the rod (13) is integral with a tensioning lever attachment element (14), wherein the attachment element (14) consists of a retaining piece hinged on the tensioning lever (2) by a pin (30) and having a cylindrical longitudinal hole (21) having a smooth inner surface which passes through the attachment element (14) from end to end and through which the said rod (13) passes and of a rotating adjustment button (22) provided with a tapped hole into which the said threaded part of the rod is screwed, this button bearing against the end of the attachment element opposite to the first hooking means, and wherein the assembly formed by the threaded rod (13) and the adjustment button (22) is axially locked inside the attachment element (14) by said pin (30) the surface of said pin creating means for engaging the rod (13) and locking the rod in place within the attachment element (14).

4,893,385

MEMORIAL VAULT APPARATUS

Truman F. Schrag, 2460B Hamlet La., Colorado Springs, Colo. 80918

Filed Jan. 23, 1989, Ser. No. 300,306
Int. Cl.[4] A61G *17/00*; E04H *13/00*
U.S. Cl. 27—35 **6 Claims**



1. A memorial vault apparatus for human cremated remains comprising:

burial vaults;

a concrete slab having a top level surface;

a first set of elongated parallel cylindrical pipes supported on said top level surface, each adjacent pair of pipes being equidistantly spaced from each other and each pipe of the first set having a top and a longitudinal axis;

a second set of elongated parallel cylindrical pipes, each adjacent pair of pipes in said second set being equidistantly spaced from each other, each of the pipes of the second set of pipes being perpendicular to each of the pipes of the first set of pipes and each of the pipes of the second set having a bottom and a longitudinal axis, means for connecting each of the pipes of the second set of pipes to each of the pipes of the first set of pipes, for forming a grid work among said first and second set of pipes for forming spaces to receive said burial vaults, each of said connecting means comprising a saddle means having a first semi-cylindrical surface thereon in abutment with the top of one of the first set of pipes, said first semi-cylindrical surface being formed about an axis parallel to the longitudinal axis of the pipe of said first set of pipes on which it abuts and a second semi-cylindrical surface thereon in abutment with the bottom of one of the second set of pipes, said second semi-cylindrical surface being formed about an axis parallel to the longitudinal axis of the pipe of said second set of pipes which it abuts the bottom thereof, each of said saddle means being adhesively cemented to the pipes which each saddle means abuts;

cylindrical vaults being disposed in said spaces formed in said grid work, a sealed bottom on each vault being in abutment with the top of said level surface, each of said vaults also having a tightly fitting cylindrical cap on the top thereof; and

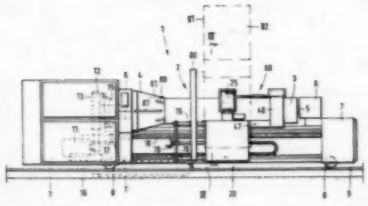
an aggregate material such as sand or gravel covering all of the concrete slab, grid work and vaults.

4,893,386

APPARATUS FOR THE PRODUCTION OF PATTERN WARPS ETC. ON A CONE WARPING MACHINE

Wilhelm Thier, Billerbeck; Josef Lenzen, Duelmen; Erich Uckelmann, deceased, late of Ahaus-Wessum (by Renate Uckelmann, heiress), and Herbert Wisniewski, Coesfeld-Lette, all of Fed. Rep. of Germany, assignors to Hergeth Hollingsworth GmbH, Duelmen, Fed. Rep. of Germany

Filed Sep. 30, 1988, Ser. No. 252,295
Claims priority, application Fed. Rep. of Germany, Oct. 6, 1987, 3733692
Int. Cl.[4] D02H *3/00, 5/00, 7/00*
U.S. Cl. 28—191 **21 Claims**



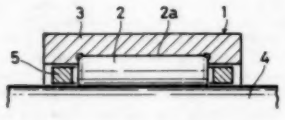
1. Apparatus for producing pattern warps on a cone warping machine of the type comprising a drum having a cone portion, a support means for receiving a heddle frame, a warping reed, lease rods disposed in slots of the cone portion of the drum, displacement means for displacing the lease rods along the drum axis, driving means for rotating the drum and for moving said support means along the drum axis, and a control means for controlling said drive means to provide for the intermittent rotation of the drum and for the displacement of the support means in a predetermined relation; characterized in that said displacement means for displacing said lease rods includes a tong-type gripper having a pair of tong legs for engaging said lease rod.

4,893,387

ROLLER ELEMENTS FOR ROLLER BEARING

Yoshinobu Akamatsu, Kuwana; Morikatu Kotani, Iwata; Toshihide Goto, Morimachi; Kenji Hibi, Gifu, and Toshihiko Matsushima, Iwata, all of Japan, assignors to NTN Toyo Bearing Co., Ltd., Osaka, Japan

Filed Feb. 27, 1989, Ser. No. 315,876
Claims priority, application Japan, May 30, 1988, 63-133794; Sep. 20, 1988, 63-235732
Int. Cl.[4] B21B *31/07*
U.S. Cl. 29—121.1 **1 Claim**



1. A roller element for use in a roller bearing, said roller element having a surface extending in longitudinal and circumferential directions and formed with a multiplicity of minute recesses arranged in random directions on said surface so that the ratio RMS(L)/RMS(C) is not more than 0.8 wherein RMS(L) is the surface roughness mean square value in the

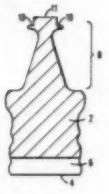
longitudinal direction of said surface and RMS(C) is the surface roughness mean square value in the circumferential direction of the surface and so that the SK value is not more than −2.0 in both the longitudinal and circumferential directions of said surface wherein the SK value represents skewness that indicates a distribution curve of surface roughness of said longitudinal and circumferential surface.

4,893,388

METHOD OF MODIFYING TURBINE ROTOR DISCS

Dennis R. Amos, Rock Hill, S.C.; Robert E. Clark, Orlando; Roger W. Heinig, Cocoa Beach, both of Fla., and Stephen R. Reid, Newark, Del., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 8, 1988, Ser. No. 281,136
Int. Cl.[4] B21K *3/04*
U.S. Cl. 29—156.8 R **10 Claims**



1. A method for modifying an original blade supporting disc which is integral with a turbine rotor, and which has an original outline, in order to create a modified disc which has an outline different from the original outline and which provides a blade-supporting region of increased size, the original disk having at least one portion which must be removed in order to create the modified disc, comprising:

machining away each said portion of the original disc;

building up the original disc with weld metal past the eventual outline of the modified disc at all locations where the outline of the original disc, after said machining step, is to be enclosed by the outline of said modified disc; and

machining away parts of the weld metal to the outline of the modified disc.

4,893,389

REINSTATEMENT OF LATERAL BRANCH CONNECTIONS IN RELINED SEWERS OR PIPES

Peter Allen, and Sydney Molyneux, both of P.O. Box 226, Brisbane Markets, QLD, 4106, Australia

PCT No. PCT/AU87/00081, § 371 Date Sep. 30, 1988, § 102(e) Date Sep. 30, 1988, PCT Pub. No. WO87/05984, PCT Pub. Date Oct. 8, 1987
PCT Filed Mar. 25, 1987, Ser. No. 272,803
Claims priority, application Australia, Mar. 25, 1986, PH5195
Int. Cl.[4] B21D *53/00*
U.S. Cl. 29—157 T **5 Claims**

1. A method for the reinstatement of lateral branch connections in relined sewers or pipes including the steps of:

sealing the connection of the lateral branch to the sewer or pipe before a liner has been grouted in the sewer or pipe;

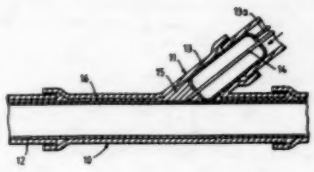
injecting grout into the area at the connection and inwardly of the seal, and into the area between the liner and the pipe;

removing the seal after the liner has been grouted in the sewer or pipe at the connection and the grout has at least initially set;

letting the grout fully set;

cutting out a pilot hole, aligned with the lateral branch, through the grout and the liner in the sewer or pipe with a first cutting tool fed down the lateral branch; and

cutting out the grout and the liner with a second cutting tool, fed towards the lateral branch from the sewer or



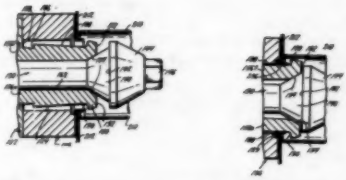
pipe, to open the pilot hole to substantially the diameter of the lateral branch to reinstate the connection.

4,893,390

METHOD AND EXPANDER FOR MANUFACTURING A FURNACE HEAT EXCHANGER AND PLATE ASSEMBLY

Russell W. Hoeffken, Belleville, Ill., assignor to Snyder General Corporation, Red Bud, Ill.

Filed Sep. 1, 1988, Ser. No. 239,348
Int. Cl.[4] B21D *53/00*; B21K *29/00*; B23P *15/26*
U.S. Cl. 29—157.3 R **19 Claims**



13. A method for securing a tubular heat exchanger unit of a furnace to a plate member, comprising the steps of:

providing said heat exchanger unit as a relatively thin walled sheet metal structure defining a chamber for the flow of fluid to be in heat exchange relationship with the walls of said heat exchanger unit, said heat exchanger unit having at least one opening into said chamber through a wall of said heat exchanger unit and defined by a peripheral rim;

providing a plate member including an opening corresponding to said opening in said heat exchanger unit and defined by a perimeter flange projecting from the plane of said plate member;

inserting said flange into said chamber through said opening in said heat exchanger unit; and

bending said flange radially outwardly and axially into engagement with an inner wall surface of said heat exchanger unit at the periphery of said opening and substantially without displacement of said rim to form a substantially rigid leakproof joint between said heat exchanger unit and said plate member;

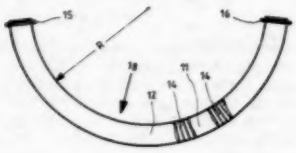
the step of bending said flange being carried out using a tool including a plurality of at least eight radially expandable and contractable laminar jaw members, said method including the steps of inserting said tool through said opening in said plate member and into said chamber, actuating said jaw members to move radially outward into engagement with portions of said flange, moving said jaw members axially to bend said flange into engagement with said heat exchanger unit, contracting said jaw members radially inwardly, and removing said tool from said opening in said plate member, the number of flange engaging jaw segments being such that a single sequence of said flange engaging jaw segments radially outward with respect to an axis and axially with respect to said axis to bend said flange into engagement with said heat exchanger unit forms a substantially rigid leakproof joint.

15. An expander comprising:
a body,
an opening through the body,
a mandrel movable axially through the opening,
a plurality of at least eight laminar jaw segments extending axially within the opening and positioned circumferentially about the mandrel,
the body having a crimping area on the body surrounding the opening, the jaw segments having complementary crimping areas,
means on the mandrel for moving the jaws "radially outwardly and thereafter" axially upon movement of the mandrel in an axial direction to move the complementary jaw crimping areas toward the body crimping area for crimping two metal components together in a fluid-tight connection about an opening,
the jaw segments being of sufficient number to minimize the space between adjacent jaw segments upon said radially outward movement of the jaw segments whereby a single operation of the expander produces a fluid-tight seal between the two metal components about the entire perimeter of the opening.

4,893,391
METHOD AND APPARATUS FOR PRODUCING ROUND-ROLLED PARTS FOR HEAT EXCHANGERS

Werner Zobel, Böblingen, and Wolfgang Ostertag, Walddorfhäslach, both of Fed. Rep. of Germany, assignors to Kühlerfabrik Längerer & Reich GMBH & Co. KG, Fed. Rep. of Germany

Filed Jun. 15, 1988, Ser. No. 207,374
Claims priority, application Fed. Rep. of Germany, Jun. 27, 1987, 3721257
Int. Cl.[4] B23P *15/26*
U.S. Cl. 29—157.3 R 27 Claims



1. A method of making a round-rolled part for a heat exchanger comprising a network of spaced-apart tubes and, in between said spaced-apart tubes, a plurality of irradiating elements, said method comprising:
a. connecting said tubes and said irradiating elements to each other to form a rectilinear one of said networks of said spaced-apart tubes, said network having two ends;
b. clamping both of said ends of said rectilinear network to put said rectilinear network under tension; and
c. stretching and bending said clamped rectilinear network of said tubes and said irradiating elements so that said network assumes an arcuate shape.

12. An apparatus for producing a round-rolled part for a heat exchanger comprising a network of spaced-apart tubes and, in between said spaced-apart tubes, a plurality of irradiating elements, and two side parts and at least one end plate for said tubes comprising:
a. a locally fixed round bending tool operated by rotation on which said network of said tubes is bent to form said round-rolled part;
b. a clamping means which maintains one end of said network of said tubes substantially tangentially while clamping said network fixed on said round bending tool;
c. a mating holder spaced from said round bending tool provided with a gripping means for the other end of said network of said tubes; and
d. an entraining means which engages between said end plate and said side parts at respective ends of said network of said tubes for both said gripping means and said clamping means.

4,893,392
METHOD OF MANUFACTURING AN IMPROVED KNOB BY INJECTION MOLDING

David K. Stricker, Juneau; John B. Kuhn, Rubicon; Virgil P. Huhmann, Beaver Dam, and William E. Chase, Colgate, all of Wis., assignors to Deere & Company, Moline, Ill.

Division of Ser. No. 3,332, Jan. 13, 1987, Pat. No. 4,783,884.
This application Jul. 27, 1988, Ser. No. 224,628
Int. Cl.[4] B21D *53/38*
U.S. Cl. 29—161 1 Claim

1. A method of manufacturing an improved resilient knob by injection molding comprising the steps of:
forming a generally cylindrically shaped knob body having an elongated cavity having a plurality of knife edges formed therein, the cavity extending to and terminating at a terminal exterior surface of the body located approximately at mid-point from top of said body;
forming an elongated extension projecting from the terminal exterior surface of the body; and extending outwardly beyond the terminal exterior surface of the body;
forming a resilient projection on the extension spaced from said exterior surface, extending outwardly from the extension and having a tapered portion formed on a distal end of said extension remote from said cavity;
forming said knife edges for biasing the extension in the direction of the projection; and
forming said tapered portion integrally formed near the end of the extension.

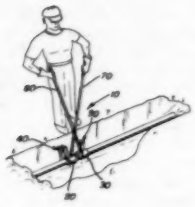
4,893,393
PIPE FITTING ASSEMBLY TOOL

Ben C. Marshall, 31 Walker Ave., Gaithersburg, Md. 20877

Filed Oct. 25, 1988, Ser. No. 261,960
Int. Cl.[4] F16L *35/00*
U.S. Cl. 29—237 7 Claims

1. A pipe fitting assembly tool for connecting and disconnecting pipes comprising:
a pair of lever clamping systems including a pair of clamps which encircle and lock the pipes, each of said clamps includes a pair of opposing arcuate half clamps, each of said half clamps pivotally connected by means of a separate straight lever arm secured thereto and extending upwardly and inwardly therefrom and pivotally attached to each other above said clamps in scissors structure which open and close said half clamps said lever arms adjustably joined at the top by a pivotally attached cam lever locking system, each of said clamping systems is pivotally attached to the bottom of long straight separate handle bars extending upwardly therefrom and which are pivotally attached to each other in a scissors structure,

whereby said clamping systems operate locking and unlocking of the pipes in the clamps and said handle bars operate



movement of the locked pipes along a single plane to and from each other.

4,893,394

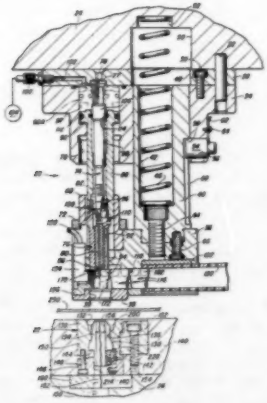
INSTALLATION APPARATUS FOR ATTACHING A FEMALE ELEMENT TO A PANEL

Rudolf R. M. Muller, Frankfurt, Fed. Rep. of Germany, assignor to Multifastener Corporation, Detroit, Mich.

Division of Ser. No. 111,966, Oct. 21, 1987, Pat. No. 4,831,698, which is a continuation-in-part of Ser. No. 69,804, Aug. 17, 1987, Pat. No. 4,810,143, which is a division of Ser. No. 869,507, Jun. 2, 1986, Pat. No. 4,700,470, which is a division of Ser. No. 657,570, Oct. 4, 1984, Pat. No. 4,610,072, which is a continuation-in-part of Ser. No. 563,833, Oct. 21, 1983, Pat. No. 4,555,838, which is a continuation-in-part of Ser. No. 504,074, Jun. 14, 1983, Pat. No. 4,543,701, and a continuation-in-part of Ser. No. 485,099, Mar. 28, 1983, Pat. No. 4,459,073, said Ser. No. 504,074, is a continuation of Ser. No. 229,274, Jan. 28, 1981, abandoned, said Ser. No. 485,099, is a division of Ser. No. 229,274, Jan. 28, 1981, abandoned. This application Nov. 14, 1988, Ser. No. 271,123

Int. Cl.[4] B23P *11/00*

U.S. Cl. 29—243.52 **3 Claims**



1. A die set for attaching a female element to a plastically deformable panel, said die set including a die assembly, a punch and a driving member, said female element including a body portion having a bore therethrough and an integral annular barrel portion generally concentric with said body portion bore having internal and external surfaces and an open free end, said die assembly including a die member having a concave bowl-shaped die cavity, a panel supporting surface on at least opposed sides of said die cavity and a bore through the center of said die cavity, a die post telescopically extending through said die member bore projecting into said die cavity having a free end and an axial bore extending through said free end, said die post having a radially outwardly extending concave arcuate die surface spaced from said free die post end and said die cavity having a generally concave mating surface, biasing means resiliently biasing said die post into said die cavity to extend said die post free end to near the plane of said die member panel supporting surface and stop means limiting movement of said die post into said die cavity against the force of said biasing means substantially aligning said die post radially outwardly concave arcuate die surface and said mating die cavity surface, said punch having a free end telescopically receivable through said bore and barrel portion of said female element to engage a panel supported on said die member panel supporting surface, said punch free end including an axially extending piercing end having a diameter substantially less than said internal barrel portion surface to pierce a slug from said panel forming a pierced panel opening followed by an enlarged convex arcuate drawing portion which is driven against said panel and through said panel opening, and an annular driving member telescopically received around said punch to engage said fastener element body portion to drive said barrel portion free end through said panel opening into said die cavity and against said mating die surfaces to radially outwardly deform said barrel portion free end into locking engagement with said panel.

4,893,395

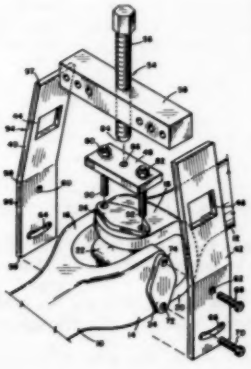
U-JOINT PULLER

Glen R. Crowder, Rt. No. 1, Box 41, Wyandotte, Okla. 74370

Filed Sep. 22, 1988, Ser. No. 247,743

Int. Cl.[4] B23P *19/04*

U.S. Cl. 29—259 **1 Claim**



1. An apparatus for removing a bearing cup normally held by a pair of bolts from a universal joint of the type having a first yoke member and a second yoke member, and each said yoke having opposed arms, each said arm having a bearing cup mounted therein, comprising:

a Tee-puller having a pusher bolt and a cross bar;

first and second legs, each said leg having a hole toward one end through which said cross bar may extend, each said leg being an elongated flat member having a first upper section and a second bottom section in which said first section is bent inwardly with respect to the second section, and having a pair of first and second vertically spaced bolt holes on said second section, said bolt holes being spaced apart a distance equal to the centerline distance of said pair of bolts holding said bearing cup, at least one of said bolt holes being in the form of an arcuate slot, and means to attach said first and second legs, via said first and second bolt holes, to a pair of said bearing cups of said

first yoke for removal of a bearing cup that is transverse thereto in one of said arms of said second yoke.

4,893,396

METHOD OF SETTING UP APPARATUS FOR HANDLING ELECTRICAL OR ELECTRONIC COMPONENTS

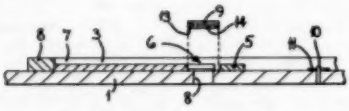
Steven J. H. Ainsworth, and Derek R. Dane, both of Colchester, England, assignors to Emhart Industries, Inc., Hartford, Conn.

Filed Jan. 11, 1989, Ser. No. 295,964

Claims priority, application United Kingdom, Jan. 28, 1988, 8801897

Int. Cl.[4] B23Q *17/00*

U.S. Cl. 29—407 **2 Claims**



1. A method of setting up a component placement machine comprising a substrate supporting X-Y table, a head having a tool displaceable between an up position and a down component pick up/deposit position, the head movable, with the tool at the up position, to locate the tool at pick up, inspection and deposit locations, comprising

removably mounting a test component on the X-Y table at a precise X-Y location,

picking up the removably mounted test component with the tool,

displacing the tool to the up position and moving the head to locate the tool at the inspection station and

inspecting the test electronic component held by the tool at the inspection to determine its X-Y location, and

comparing the actual and theorretical X-Y locations and determining X, Y corrections for such tool as it is displaced between the inspection location and the deposit location.

4,893,397

FIRE-RESISTANT CONTAINER AND METHOD OF ASSEMBLING SAME

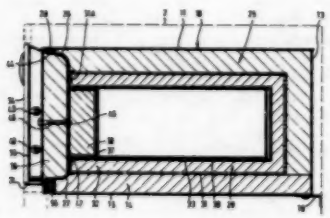
John T. Hughes, Cromwell Crescent, United Kingdom, assignor to Micropore International Limited, Worcestershire, United Kingdom

Filed Nov. 25, 1987, Ser. No. 125,453

Claims priority, application United Kingdom, Nov. 27, 1986, 8628424

Int. Cl.[4] B61O *39/03*

U.S. Cl. 29—428 **4 Claims**



1. A method of assembling a fire-resistant container for magnetic media into a filing cabinet incorporating a casing having a front open face and at least one recess dimensioned to receive a filing drawer of conventional dimensions, which method comprises the steps of:

fitting a base of thermal insulation material securely to the casing of the filing cabinet, the base extending between side walls of the casing and from the region of the open face of the casing towards the rear thereof;

positioning on the base and within the casing a body of thermal insulation material which incorporates a heat absorbing material and securing the body to the base, the body comprising side walls, a rear wall and a top, the side walls and the rear wall engaging with the base so as to define therewith a storage cavity which opens towards the front open face of the casing; and

inserting into the storage cavity a storage drawer having a facing to co-operate with the front open face of the casing, which storage drawer is provided with a body of thermal insulation material which body, in use, co-operates with the body defining the storage cavity so as to close and insulate the storage cavity.

4,893,398

DEVICE FOR AUTOMATIC JOINING AND MACHINING

Ernst Zimmer, Friedberg, Fed. Rep. of Germany, assignor to Kuka GmbH, Augsburg, Fed. Rep. of Germany

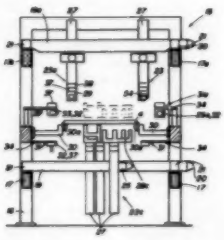
PCT No. PCT/EP86/00073, § 371 Date Oct. 22, 1986, § 102(e) Date Oct. 22, 1986, PCT Pub. No. WO86/04871, PCT Pub. Date Aug. 28, 1986

PCT Filed Feb. 14, 1986, Ser. No. 925,000

Claims priority, application Fed. Rep. of Germany, Feb. 22, 1985, 3506314

Int. Cl.[4] B23Q *3/155*; B23K *11/00*; B62D *65/00*

U.S. Cl. 29—568 **22 Claims**



1. A machining station for joining and machining different assemblies, comprising: a single workpiece carrier for each assembly, said single workpiece carrier carrying several components which cooperate to form an assembly;

a machining station frame defining a machining station area;

positioning means for positioning said single workpiece carrier relative to the machining frame in the machining area;

a first tool carrier set positioned at one level, substantially parallel to said workpiece carrier, on one side of each of said workpiece carrier and said positioning means;

a second tool carrier set positioned at another level, substantially parallel to said workpiece carrier, on another side of each of said workpiece carrier and said positioning means, each of said tool carrier sets including at least one tool carrier, each of said tool carriers including tool carrier movement means for moving a tool carrier head end in three separate dimensions;

first tool carrier set mounting and movement means for movably mounting said first tool carrier set with respect to said machining station machine frame and for moving said first tool carrier set relative to said frame in said one level;

second tool carrier set mounting and movement means for movably mounting said second tool carrier set with re-

spect to said machining station machine frame and for moving said first tool carrier set relative to said frame in said another level;

a tool magazine, connected to said machining station machine frame and accessible by said first and second tool carriers to exchange tools, said tool magazine holding a plurality of freely exchangeable tools adapted to be carried by said first and second tool carriers including a tool for gripping assembly components from said workpiece carrier and moving said components to a chucking position, and including a tool for chucking said components and a tool for welding said components.

4,893,399

APPARATUS FOR CHANGING TOOLS OF A NUMERICALLY CONTROLLED MACHINING CENTER

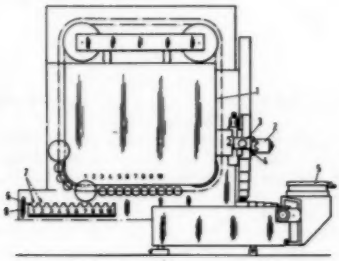
Helmut Hammer, Berlin, Fed. Rep. of Germany, assignor to Werner und Kolb Werkzeugmaschinen GmbH, Berlin, Fed. Rep. of Germany

Filed Apr. 25, 1988, Ser. No. 186,051

Claims priority, application Fed. Rep. of Germany, May 1, 1987, 3714967; May 8, 1987, 3715874

Int. Cl.[4] B23Q *3/157*

U.S. Cl. 29—568 **26 Claims**



1. An apparatus for changing tools of a numerically controlled machining center having a tool chain magazine which has a straight chain strand, comprising first means having a plurality of tool receptacles which are arranged one behind the other, are immovable relative to one another and have the same spacings as the tool receptacles of the chain magazine, second means having means for accommodating said first means and for moving said first means between a normal position and a first position, third means for transferring one or more tools directly between said first means and said strand in said first position, said first means being loadable and unloadable with regard to the tools in said normal position,

the improvement comprising said first means being a first cassette (6) consisting of a single piece, being movable from said normal position to said first position and back as accommodated on said second means and being slideably separable from said second means, and fourth means slideably accommodating plural cassettes for exchanging said first cassette (6) for another cassette in said normal position.

4,893,400

METHOD OF MAKING A REPAIRABLE TRANSFORMER HAVING AMORPHOUS METAL CORE

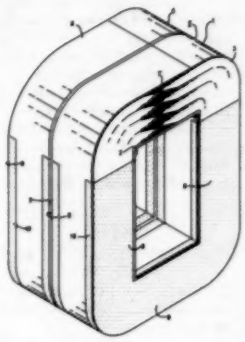
Terrence E. Chenoweth, Watkinsville, Ga., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 21, 1987, Ser. No. 87,929

Int. Cl.[4] H01F *41/02*

U.S. Cl. 29—606 **8 Claims**

1. In a method of making a transformer having a wound amorphous metal core with a core joint in a cut leg, an improvement that makes said transformer repairable, characterized by completely enclosing said core in materials that prevents the escape of particles of said amorphous metal, where some of said materials, are impregnated with a curable adhesive, and curing said adhesive to bond materials impregnated therewith to said core, while preventing said adhesive from bonding to the edges of said cut leg and to the edges of the radii that adjoin said cut leg.



4,893,401

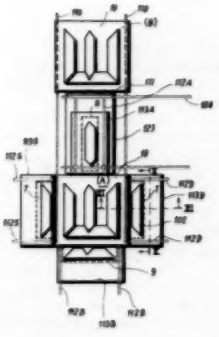
AUTOMATIC TRANSFORMER CORE ASSEMBLY SYSTEM

Ioseph Viani, Pomezia, Italy, assignor to Ansaldo Componenti S.p.A., Genoa, Italy

Filed Oct. 7, 1988, Ser. No. 255,158

Int. Cl.[4] H01F *41/02*

U.S. Cl. 29—738 **8 Claims**



1. A transformer core assembly system for assembly of transformer laminated cores having three parallel legs and two yokes, the system comprising, a movable support frame on which individual transformer laminated cores are formed by stacking of core laminations thereon, the support frame being cyclically movable from a core lamination loading station after completion of a transformer laminated core thereon movable to another station for removal of a completed transformer laminated core thereon and then after removal of the completed transformer laminated core restored to the core lamination loading station, four individual movable platforms each having a stack of respective transformer core laminations thereon cyclically positioned at four individual lamination feed positions circumferentially about the support frame when the

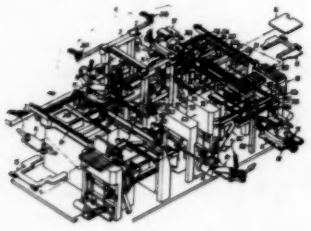
support frame is at said core lamination loading station and each movable independently cyclically from a respective lamination feed position in a selected sequence to an individual lamination loading position for loading of core laminations and when loaded with core laminations restored to the respective lamination feed position, four overhead travelling cranes cyclically operable independently in a selected sequence to said feed positions for feeding core laminations from a respective movable platform in a selected sequence on to the support frame for assemblying a transformer laminated core thereon and operable for loading laminations thereon when the respective platforms are at the respective lamination loading positions, and the four cranes having means for independently lifting and lowering the laminations individually for stacking thereof on the support frame and the corresponding platforms.

4,893,402

SYSTEM FOR ASSEMBLING BOTTOM PARTS FOR VEHICLES

Mitsuaki Hirasaka; Kunio Nokajima, and Nagatoshi Murata, all of Sayama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 9, 1988, Ser. No. 230,082
Claims priority, application Japan, Oct. 8, 1987, 62-198343
Int. Cl.[4] B21B *39/14*
U.S. Cl. 29—771 **14 Claims**



1. A system for assembling bottom parts for vehicles, in which the bottom parts are transported to a position below a vehicle body positioned and fixed and are assembled to said vehicle body, said system comprising:

a pallet member for holding thereon bottom parts and a plurality of threaded parts for fastening said bottom parts to said vehicle body;

a transporter for circulating said pallet member so that said pallet member is stopped below said vehicle body;

a first feeder disposed in a vicinity of said transporter to feed said threaded parts to said pallet member;

a second feeder also disposed in a vicinity of said transporter to feed said bottom parts to said pallet member;

a lifter disposed below said vehicle body to raise and lower said pallet member relative to said vehicle body; and

a turning machine also disposed below said vehicle body for turning said threaded part to fasten said bottom part to said vehicle body when said pallet member is in a raised position.

4,893,403

CHIP ALIGNMENT METHOD

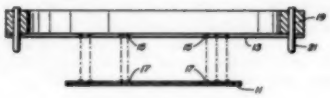
Bruce Heflinger, Los Altos, and Kevin Douglas, San Mateo, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Apr. 15, 1988, Ser. No. 181,875
Int. Cl.[4] H05K *3/34*
U.S. Cl. 29—840 **12 Claims**

1. A method of aligning integrated circuit chips on a substrate comprising,

making a chip transfer plate from a stencil mask having holes therein in locations matched to solder bumps on a solder bump substrate where integrated circuit chips of the types having contacts for connection to said solder bumps are to be mounted,

placing said integrated circuit chips in an alignment configuration which is the same as on said solder bump substrate,



picking up said integrated circuit chips using said transfer plate while preserving chip alignment, and

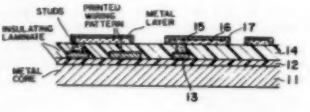
placing chip contacts onto solder bumps on the solder bump substrate and joining said contacts to said bumps.

4,893,404

METHOD FOR PRODUCING A MULTILAYER PRINTED WIRING BOARD

Isao Shirahata, Kanagawa; Shoji Shiga, Tochigi; Hisako Hori, Tokyo, and Takamasa Jinbo, Kanagawa, all of Japan, assignors to Furukawa Denki Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 55,706, May 29, 1987, Pat. No. 4,791,239.
This application Sep. 13, 1988, Ser. No. 244,050
Claims priority, application Japan, May 30, 1986, 61-125118
Int. Cl.[4] H01K *3/10*
U.S. Cl. 29—852 **16 Claims**



1. A method for producing a multilayer printed wiring board comprising the following steps:

(a) forming a first layer of printed wiring pattern by a subtractive process on a metal foil layer of a metal foil-clad insulated metal core comprising a metal foil having at least one surface thereof roughened such that an average value of differences in height between peaks and valleys thereof is at least 1 μm and a metal core to which said metal foil is bonded through a first insulating laminate, with said roughened surface serving as a nonbonding surface;

(b) curing a resin-type conductive paste to form a plurality of through studs for current flow between said first layer of printed wiring pattern and a second layer of printed wiring pattern to be formed next and forming a second insulating laminate for providing insulation spaces of said first layer of printeed wiring pattern and between said first and second layers of printed wiring patterns; and

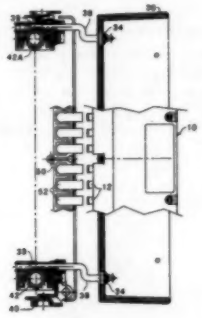
(c) forming said second layer of printed wiring pattern by screen printing a resin-type conductive paste in a desired pattern on the surface of said through studs and said second insulating laminate, curing said conductive paste and applying an electrodeless plating thereto.

4,893,405

METHOD OF CORRECTING CONNECTORS TO LEADS ON PCBS

Roy E. Pennington, Loveland, Colo., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Division of Ser. No. 44,084, Apr. 29, 1987, Pat. No. 4,804,335.
This application Nov. 9, 1988, Ser. No. 269,851
Int. Cl.[4] H01R *43/00*
U.S. Cl. 29—857 1 Claim



1. A method for interconnecting a bank of electrical connectors with electrical leads on printed circuit cards which are accessible at the opening of a mainframe card cage, wherein said method comprises the steps of:

(a) attaching a frame assembly to said opening of said mainframe card cage, wherein said frame assembly includes (i) a plurality of retractable support members, and (ii) arm means carried by the frame assembly and being adapted to move the support member outwardly from the frame and inwardly toward the frame assembly;

(b) securing a bank of electrical leads in a terminal block comprising (i) a housing having front and rear faces, (ii) a plurality of elongated electrical conductors secured to the electrical connectors and extending rearwardly through the rear face of the housing, and (iii) alignment means carried by the front face of the housing and being adapted to align said bank of electrical connectors with said electrical leads on said printed circuit card;

(c) retaining said terminal block in an interconnect module which is adapted to be attached to said retractable support members of said frame assembly;

(d) attaching said interconnect module to said retractable support members; and

(e) moving said arm means so as to move said support members toward said frame assembly in a manner such that said electrical connectors become coupled to said electrical leads on said printed circuit card.

4,893,406

EXTENSION APPARATUS FOR TOENAIL CLIPPERS

James D. Larson, P.O. Box 972, Vashon, Wash. 98070

Filed Oct. 12, 1988, Ser. No. 256,529
Int. Cl.[4] A45D *29/02*
U.S. Cl. 30—28 2 Claims

1. The combination of a conventional nail clipping device having a pair of jaw members mounted for relative reciprocation with respect to one another by virtue of the movement of an actuating lever, and an extension apparatus wherein the extension apparatus consists of:

an extension unit comprising an elongated extension member having the conventional nail clipping device operatively secured on the lower portion of the elongated extension member and disposed in a generally perpendicular fashion to the longitudinal axis of said elongated extension member;

a remote actuating unit comprising an elongated spring loaded cable element which is contained in a flexible sheath element wherein the spring loaded cable element is operatively secured on one end to the actuating lever of said conventional nail clipping device for the purpose of exerting a downwardly directed force thereon; wherein, the other end of said remote actuating unit is operatively connected to the upper portion of the elongated extension member;

a visual inspection member operatively associated with the extension unit wherein the visual inspection member comprises a magnifying glass element which is operatively secured to said elongated extension member above the location of said conventional nail clipping device; and,

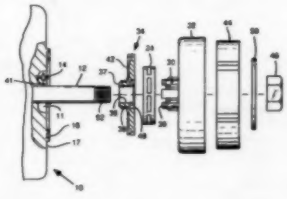
a support member operatively associated with the extension unit wherein the support member comprises a leg brace element which is disposed above the location of both the conventional nail clipping device and the visual inspection member; and, wherein both the leg brace element and the visual inspection member are movably disposed relative to the longitudinal axis of said extension member.

4,893,407

INTEGRAL DUST COVER AND PUMP DRIVE

Ronald D. Lane, Lake Oswego, Oreg., assignor to Blount, Inc., Portland, Oreg.

Filed May 30, 1989, Ser. No. 358,086
Int. Cl.[4] F16N *13/14*
U.S. Cl. 30—123.4 4 Claims



1. A chain saw having a housing and a drive shaft protruding from a cavity in the housing, a pump gear for generating a pumping action for a lubricating pump, said pump gear mounted in the cavity of the housing and adjacent the output shaft, and said housing having an annular groove surrounding the cavity;

a centrifugal clutch mounted on the outboard end of the output shaft, a clutch cup surrounding the centrifugal clutch and a hub adapter having a splined exterior pro-

truding from the clutch cup, said adapter surrounding the output shaft and extending inwardly along the drive shaft toward the housing and said adapter having limited axial movement along said output shaft, a sprocket mounted on the splined exterior of the hub adapter,

and the improvement which comprises; a combination member having a disc shaped seal portion integral with a hub shaped gear driver portion, said combination member having a center opening that surrounds the output shaft, and slidable interlock means slidably interlocking the member with the end of the adapter of the clutch cup, and the gear drive portion interengaged with the pump gear located in the cavity of the housing, said gear driver portion driving the pump gear in reaction to the clutch cup being driven by the centrifugal clutch, and an annular lip protruded from the disc-shaped seal portion and protruded into the groove of the housing surrounding the cavity.

4,893,408

ENCLOSED PEELING KNIFE AND PRONG HOLDER

Judith B. Mattingly, and Edward J. Mattingly, both of 1107 Memory La., 8B, Santa Ana, Calif. 92706

Filed Jan. 12, 1989, Ser. No. 297,870
Int. Cl.[4] B26B *11/00*
U.S. Cl. 30—123.5 **8 Claims**

4. An interlocking peeling knife and holding prong device comprising:

a first elongated handle having a first front face and further having a peeling knife extending axially outwardly from said first front face;

a second elongated handle having a second front face and further having a plurality of prongs extending axially outwardly from said second front face;

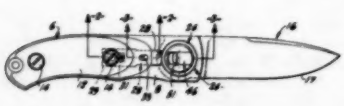
said first handle having a plurality of recesses in said first front face that are distant from said peeling knife for accommodating said plurality of prongs and said second handle having a recess on said second front face that is distant from said prongs for accommodating said peeling knife, whereby said prongs and said peeling knife may be interlocked and protectively recessed in said handles when not in use.

4,893,409

FOLDING PERSONAL KNIFE

Paul W. Poehlmann, 6480 Panoramic Hwy., Stinson Beach, Calif. 94970

Filed Oct. 6, 1987, Ser. No. 104,939
Int. Cl.[4] B26B *3/06*
U.S. Cl. 30—161 **2 Claims**



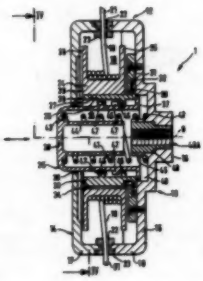
1. A folding personal knife comprising a frame having a compartment, a pivot pin having an axis, said pin engaging said frame and spanning said compartment, a knife blade receivable in said compartment and mounted to rotate about said pivot pin axis relative to said frame, means manually slidable relative to said frame and into engagement with said blade for holding said blade against rotation about said axis relative to said frame, said means including threads on said pivot pin, a nut threadedly engaging said threads on said pivot pin, and means for inhibiting relative rotation of said pivot pin and said nut relative to said frame.

4,893,410

CUTTERHEAD FOR A VEGETATION CUTTER

Joachim Hoffmann, Aichwald; Dieter Angstenberger, Leutenbach, and Gerhard Zerrer, Korb, all of Fed. Rep. of Germany, assignors to Andreas Stihl, Waiblingen, Fed. Rep. of Germany

Filed Nov. 21, 1988, Ser. No. 273,925
Claims priority, application Fed. Rep. of Germany, Nov. 20, 1987, 3739269
Int. Cl.[4] B26B *7/00*
U.S. Cl. 30—276 **11 Claims**



1. A cutterhead for a motor-driven vegetation cutter defining a drive axis about which the cutterhead is rotatably driven, the cutterhead comprising:

a housing adapted to be rotated by the vegetation cutter about said drive axis;

said housing having a base and a side wall extending upwardly from said base to define an enclosed space;

a spool rotatably journalled in said enclosed space, said spool having a hub for accommodating a coil of cutting filament thereon and having first and second flanges connected to respective longitudinal ends of said hub for delimiting said coil;

indexing means for permitting an incremental rotation of said spool relative to said housing to pay out incremental lengths of the cutting filament;

said indexing means including a switching member for receiving said spool thereon so as to cause one of said flanges of said spool to be adjacent said base and for imparting said incremental rotation to said spool;

said indexing means further including: an indexing member for coacting with said switching member to provide said incremental rotation; said switching member and said indexing member being mounted in said housing so as to be displaceable relative to each other; first and second cam means formed on said switching member so as to be spaced from each other; and, first and second stop means mounted on said indexing member so as to be spaced from each other so as to cause one of said cam means to coact with one of said stop means with each displacement of said switching member and indexing member relative to each other thereby effecting said incremental rotation of said spool; and,

coupling means for coupling said spool to said switching member irrespective of which one of said flanges is adja-

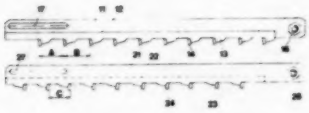
cent said base when said spool is mounted on said switching member.

4,893,411

POWER SAWBLADES FOR ABRASIVE MATERIALS

Arvo Leini, Edsbyn, Sweden, assignor to Sandvik AB, Sandviken, Sweden

Filed Nov. 17, 1988, Ser. No. 272,334
Claims priority, application Sweden, Nov. 23, 1987, 8704621
Int. Cl.[4] B27B *11/02, 33/02*
U.S. Cl. 30—369 2 Claims



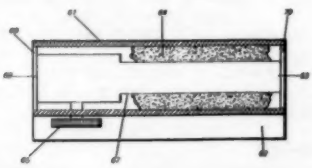
1. Sawblades for a power saw comprising a guidebar having a longitudinal groove in which the sawblades are reciprocally disposed, a first of the sawblades having forwardly facing first teeth and a second of the sawblades having rearwardly second facing teeth; each of said first and second teeth having a main cutting edge and a side cutting edge; the sawblades being mounted laterally adjacent one another within the groove for longitudinal reciprocation in opposite directions such that teeth on one sawblade become disposed laterally opposite teeth of the other sawblade so as to be disposed in cutting relationship therewith; a first distance from a selected first tooth to a preceding first tooth of said first sawblade being different than a second distance from said selected first tooth to a following first tooth on said first sawblade; a third distance from a selected second tooth to a preceding second tooth on said second sawblade being different than a fourth distance from said selected second tooth to a following second tooth on said second sawblade, said first, second, third and fourth distances being dimensioned such that no more than one tooth on either sawblade is in cutting relationship with a tooth of the other sawblade at any given instant.

4,893,412

WEAPON SIGHTING STRUCTURE

Robert E. Snodgrass, 33 Sleepy Hollow Rd., Andover, Sussex County, N.J. 07821

Continuation of Ser. No. 340, Jan. 5, 1987, abandoned, which is a continuation of Ser. No. 92,731, Aug. 24, 1987, abandoned.
This application Jan. 3, 1989, Ser. No. 293,156
Int. Cl.[4] G02B *27/32*
U.S. Cl. 33—247 2 Claims



1. A sighting structure for a rifle wherein said rifle has a barrel with defined barrel longitudinal axis, said structure comprisng:

telescope means for sighting, having a defined telescope longitudinal axis;

open-ended hollow cylindrical housing means for loosely enclosing said telescope means, and for holding said telescope means so that the longitudinal axes of said telescope and barrel means are completely aligned or are essentially parallel;

singular rubber sleeve means within said housing means along at least two-thirds of the full length of said telescope and surrounding said telescope means as a sleeve which is firmly attached to both the inside of the said housing means and to the outside of the telescope means;

first adjustment screw adapted in a first hole in said housing means so that said first screw engages said telescope means for displacing it in a first direction at will by tightening said first screw, or in the reverse said first direction by loosening said first screw, respectively, such displacement of the telescope by tightening causing compression of said rubber sleeve between the telescope and the inside surface of said housing;

second adjustment screw adapted in a second hole in said housing means so that said second screw engages said telescope means for displacing it in a second direction at will by respectively tightening said second screw, or in the reverse said second direction by loosening said second screw, respectively, such first and second direction being essentially orthogonal to one another, displacement of said telescope by said second screw tightening also causing compression of said rubber sleeve between the telescope and the inside surface of said housing; and

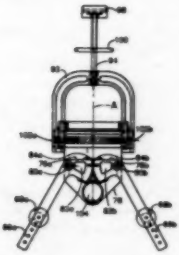
whereby the sighting direction of said telescope may be adjusted to an original setting by said first and second screws to suit an operator so that it sights essentially in the direction the rifle is pointing, wherein the combination alone of said rubber sleeve under compression and the barriers created by said first and second screws alone, as adjusted, provide for holding the telescope clamped in place in its said original setting position within said housing, and without any metal spring means for such setting; and whereby said original setting remains true even though the rifle undergoes one hundred shootings or otherwise experiences severe vibrations to the rifle elements including the telescope.

4,893,413

STEERING WHEEL CENTERING DEVICE

Marcellus S. Merrill, Denver, and Richard E. Kiefer, Boulder, both of Colo., assignors to Merrill Engineering Laboratories, Inc., Englewood, Colo.

Filed Feb. 24, 1988, Ser. No. 159,778
Int. Cl.[4] G01C *9/00*
U.S. Cl. 33—371 6 Claims



1. An apparatus for positioning a vehicle steering wheel to within a pre-selected tolerance of a centered position, comprising:

first means for sensing a deviation in the position of the steering wheel from a centered position;

second means mounted to the vehicle steering wheel for supporting said first means, said second means including

holding means for use in engaging differently configured vehicle steering wheels; and

wherein said holding means comprises first and second cams and a pair of cam arms, each of said cams being connected to one of said cam arms.

4,893,414

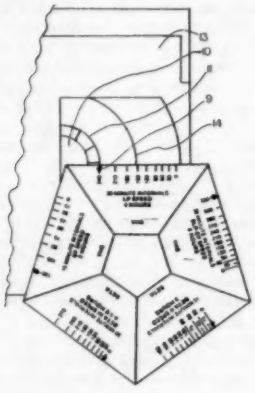
APPARATUS FOR MEASURING VIDEO CASSETTE TAPE USAGE

Michael E. Samonek, 2318 S. Overlook Rd., Cleveland Heights, Ohio 44106-3107

Filed Aug. 31, 1987, Ser. No. 90,940

Int. Cl.[4] G01B 3/00

U.S. Cl. 33—501 **6 Claims**



1. A device for measuring the taping time remaining on a video cassette comprising:

a thin pentagonal card having five straight edges and five corners;

measuring scales printed adjacent each of the edges wherein two of the scales have graduated markings corresponding to the remaining taping time one each for the different taping speeds of a BETA format video cassette, and three of the scales have graduated markings corresponding to the remaining taping time one each for the different taping speed of a VHS format video cassette, wherein the scales are centrally located on each edge, and start and end laterally inward of the corners, and the graduated markings range from zero to a maximum;

a printed designation of the taping speed each scale is calibrated to measure; and

indexing means on the scales wherein: the indexing means for the VHS scales is located at the maximum graduated marking, and the indexing means for the BETA scales is located at the zero marking.

4,893,415

METHOD FOR THE DRYING OF WOOD AND WOOD-BASED PRODUCTS

Steen Ole Moldrup, Magstraede 4, 1204 Copenhagen K, Denmark

PCT No. PCT/DK87/00012, § 371 Date Feb. 6, 1988, § 102(e) Date Feb. 6, 1988, PCT Pub. No. WO87/04779, PCT Pub. Date Aug. 13, 1987

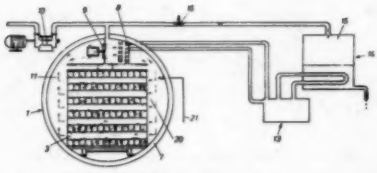
PCT Filed Feb. 6, 1987, Ser. No. 110,694

Claims priority, application Denmark, Feb. 6, 1986, 592/86

Int. Cl.[4] F28B 5/04

U.S. Cl. 34—16.5 **12 Claims**

1. An improved method for the removal of moisture from solid wood and other wood-based products, whereby the wood is first stacked with suitable air space in a drying chamber which is arranged to be able to withstand a vacuum and temperatures of up to 100° C, after which the drying chamber is closed and evacuated during the introduction of heat for the boiling out of the moisture bound in the wood, the method being the type in which one replaces the evacuated air with water vapour, the improvement comprising regulating the wood dampness and thereby the drying process by superheating said water vapour and controlling the pressure and the temperature of said superheated water vapour, and maintaining the pressure and the temperature of the superheated vapour



as uniformly as possible in the drying chamber, wherein during the drying process the water vapours are evacuated from the drying chamber by condensing the vapours in a separate cooler condensation tank, in which there is maintained a temperature lower than the dewpoint temperature of the superheated vapours existing in the drying chamber, the wood dampness and the drying process are controlled by opening a pressure regulating valve provided between the drying chamber and the cooler condensation tank each time the pressure in the drying chamber exceeds the value p, where p depends on the following equation:

$$p = \frac{RH}{100} \times (10^{8.94}) \times (10^{-(2260/t+273)}),$$

where

p=the pressure in the drying chamber measured in mm Hg absolute pressure,

RH=a value between 0 and 100, which value can be determined by those familiar with the art on the basis of the actual dampness MC, the kind and the dimension of the wood, and

t=the actual temperature in the drying chamber measured in °C,

and by closing the pressure regulating valve each time the pressure in the drying chamber is lower than p.

4,893,416

APPARATUS FOR THE CONTACTLESS GUIDING OF WEBS OF MATERIAL

Hilmar Vits, Hüscheirath 16, D-5653 Leichlingen, Fed. Rep. of Germany

Filed Jul. 6, 1988, Ser. No. 215,574

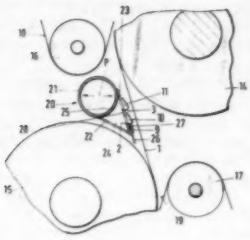
Claims priority, application Fed. Rep. of Germany, Jul. 7, 1987, 3722354

Int. Cl.[4] F26B 13/00

U.S. Cl. 34—156 **11 Claims**

1. An apparatus for the contactless guiding of webs of material comprising: at least two blow nozzles having blowjets and being arranged one behind the other in the running direction of and extending transversely to the web of material; a plurality of flow baffles being arranged in the running direction of the web of material and guiding the blowjets in the same direction and directing said blowjets obliquely against the web of material and on the side towards the web of material, said plurality of flow baffles comprising a convexly curved flow baffle and an at least one-step shock diffuser flow baffle, said convexly

curved baffle adjoining a rear blow nozzle and being convexly curved towards the web of material and the shock diffuser



flow baffle lying between the convexly curved flow baffle and a front blow nozzle.

4,893,417

INNER SHOE FOR SHELL-TYPE SKI BOOT

Antonio Dalla Lana, Montebelluna, Italy, assignor to Lange International S.A., Switzerland

Filed Sep. 9, 1988, Ser. No. 242,783

Claims priority, application Switzerland, Sep. 15, 1987, 3552/87

Int. Cl.[4] A43B *19/00, 5/04*

U.S. Cl. 36—10 **4 Claims**

1. An inner shoe for a ski-boot comprising a shell in the form of a boot with an upper region and a lower region separated by an instep region, a deformable narrow zone of lesser resistance extending horizontally across the front of the mid upper region with the ends of the deformable zone extending downward along the outer sides of the instep toward the end of the lower region of the boot, defining a tongue-shaped region, the deformable zone creating a flexible zone in the instep region.

4,893,418

SHOE INSOLE AND METHOD OF MANUFACTURE

John M. Ogden, Cincinnati, Ohio, assignor to Ogden Inc., Cincinnati, Ohio

Filed Jan. 11, 1988, Ser. No. 142,474

Int. Cl.[4] A43B *13/38, 13/40*

U.S. Cl. 36—44 **10 Claims**

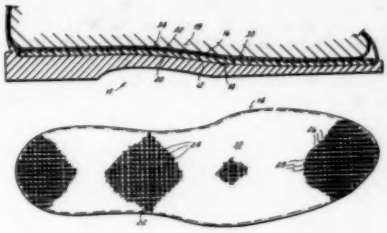
1. An insole for a shoe, comprising:

a bottom layer formed of a cushioning material, said bottom layer having an upper surface and a lower surface adapted to overlie the sole of a shoe;

a top layer formed with a plurality of apertures, said top layer having an upper surface and a lower surface;

said upper surface of said top layer being adapted to contact a foot and sock when the insole is inserted in a shoe, said upper surface of said top layer having frictional characteristics which control movement of the foot and sock with respect to said top layer within the shoe;

said top layer being at least partially embedded in said bottom layer so that said lower surface of said top layer extends beneath said upper surface of said bottom layer



and said cushioning material of said bottom layer extends at least partially into said apertures in said top layer.

4,893,419

REAR-FITTING SHELL-TYPE SKI BOOT

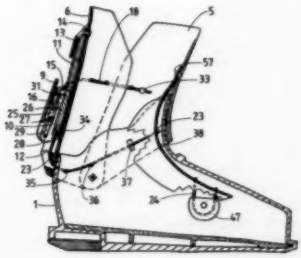
Simon Arieh, Geneva, and Guy Courvoisier, Celigny, both of Switzerland, assignors to Lange International S.A., Switzerland

Filed Jul. 13, 1988, Ser. No. 218,639

Claims priority, application Switzerland, Sep. 9, 1987, 3491/87

Int. Cl.[4] A43B *5/04;* **A43C** *11/00*

U.S. Cl. 36—119 **4 Claims**



1. Rear-fitting shell-type ski boot comprising a rigid bottom shell (1) and a two-part upper consisting of a front part (5) and a rear part (6) hinged on the bottom shell and on which there is mounted a tensioning device (8) operating in a vertical plane and acting on at least one pulling cable (17, 18, 23, 24) of a closing and/or clamping means by means of a tensioning lever (9) hinged on a support piece (10), wherein the support piece (10) of the tensioning lever is slidably mounted on a rack with ratchet teeth (11) on which it is retained by a pawl (15) against the pulling action of the cable (17, 18) connected to the tensioning lever, the pawl being kept engaged with the rack by a spring and having an arm (16) by means of which it may be separated manually from the rack.

4,893,420

CYCLIST'S SHOE

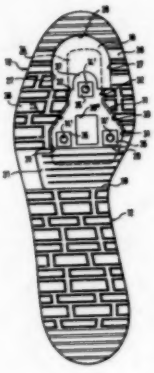
Michel Bezin, Nevers; Yves Boisot, Varennes-Vauzelles, both of France, and Otto Harsányi, Leonberg, Fed. Rep. of Germany, assignors to Look S.A., Nevers Cedex, France

Filed Jun. 22, 1988, Ser. No. 209,712

Claims priority, application European Pat. Off., Jul. 6, 1987, 87109717.6

Int. Cl.[4] A43B 5/14

U.S. Cl. 36—131 **34 Claims**



1. Cyclist's shoe for use with a cycle safety pedal having a pressure surface, a front end, a rear end, an engagement projection at said front end with said engagement projection being spaced from said pressure surface, and a pedal latch at said rear end with said pedal latch being spaced from said pressure surface; said shoe comprising a sole having a base surface, a recess in said sole, an attachment region within said recess and extending substantially parallel to said base surface, and a pedal plate which in use confronts said pressure surface having a thickness and attached to said attachment region, with said attachment region being recessed relative to said base surface by an amount substantially equal to the thickness of said pedal plate; respective front and rear spaces in said recess at the front and rear of said pedal plate respectively; a counter-projection capable of cooperating with said engagement projection located at said front of said pedal plate; a counter-latch capable of cooperating with said pedal latch at said rear of said pedal plate; said front and rear spaces accommodating said engagement projection and said pedal latch respectively and permitting movement thereof into and out of engagement with said counter-projection and said counter-latch respectively, whereby, on latching of said pedal plate on said cycle safety pedal, a locked engagement of the pedal plate is effected with respect to vertical forces, with separation of the pedal plate from the safety pedal being effected by rotation of the pedal plate about a vertical axis.

34. Cyclist's shoe for releasable engagement with a cycle safety pedal having a pedal latch and an engagement projection, said shoe comprising a sole including a recess, a pedal plate disposed in the recess and having a thickness such that the pedal plate does not substantially project downwardly beyond the sole, the recess having a size and shape to form free spaces about portions of the pedal plate adapted to accommodate the pedal latch and the engagement projection where they are in operative engagement with the pedal plate.

4,893,421

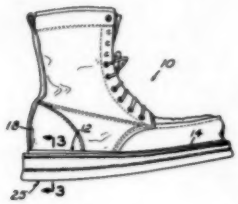
HUNTING SHOE NOISE SUPPRESSOR

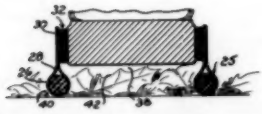
Ronald J. Folks, Box 17, Kaw City, Okla. 74641

Filed Jan. 9, 1989, Ser. No. 294,336

Int. Cl.[4] A43B 05/18, 05/00

U.S. Cl. 36—132 **3 Claims**





1. In a hunter's shoe or boot having a sole defining a generally flat bottom surface of toe and heel end portions and a substantially vertical perimeter edge surface, the improvement comprising:

continuous imperforate flexible wall means overlapping the perimeter edge surface in coextensive relation and depending therefrom normal to the bottom surface for forming a cavity between said shoe or boot and a supporting surface; and

means including cooperative self-adhering members for securing the wall means to the perimeter edge surface.

4,893,422

STEAM IRON WITH WATER SOFTENING FACILITY

Gotthard C. Mahlich, Kronberg, and Michael Borgmann, Solingen, both of Fed. Rep. of Germany, assignors to Robert Krups Stiftung & Co. KG., Solingen, Fed. Rep. of Germany

Filed Aug. 31, 1988, Ser. No. 239,211

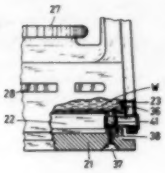
Claims priority, application Fed. Rep. of Germany, Sep. 5, 1987, 3729800

Int. Cl.[4] D06F 75/14

U.S. Cl. 38—77.3 **35 Claims**

1. In an electric appliance, such as a steam iron with a workpiece smoothing surface, the combination of a housing con-

tained in said appliance; a vessel provided in said housing and arranged to store a body of water, such as magnesium- and/or calcium-containing tap water; means for receiving water from said vessel, said receiving means being provided in said hous-



ing and extending to said smoothing surface; means defining at least one path for the flow of water in said housing from said vessel to said receiving means; and a supply of water softening agent in said path.

4,893,423

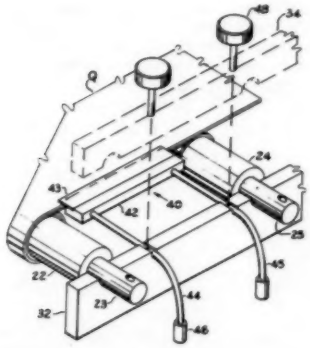
TENSIONING SYSTEM FOR QUILT FRAMES

John T. Heinrich, 5 Mt. Shasta Ct., San Rafael, Calif. 94903

Filed Sep. 6, 1988, Ser. No. 241,892

Int. Cl.[4] D06C 3/08

U.S. Cl. 38—102.1 **3 Claims**



1. A quilt frame having a support structure and at least two roller members for holding a length of quilting material, said roller members terminating in a shaft portion at each end, the improvement comprising:

a pair of tension block members located between said roller members and adjacent opposite sides of said quilting material to grip said material therebetween;

at least one tension cord member extendeing laterally from each of said tension block members;

a pair of rail members each including a rail block portion and a rail cap portion, each of said rail block and rail cap portions bearing complementary roller shaft grooves conditioned to capture said roller shafts, each of said rail members further including a tension cord groove conditioned to capture said tension cord member;

at least one clamping member adjustably connecting each of said rail block and rail cap portions; and

fastening means comprising adjustable screws for securing said tension cord members against said tension cord grooves, whereby the lateral tension on said quilted material can be varied by changing the position of said cord on said rail members.

4,893,424

METHOD AND APPARATUS FOR IDENTIFICATION OF HISTOLOGY SAMPLES

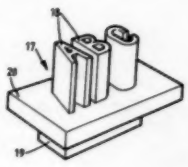
William McLean, 1 Hill Cottage, Bockelton, Tenbury Wells, England (WR15 8PP)

Continuation of Ser. No. 832,711, Feb. 14, 1986, abandoned. This application Nov. 9, 1987, Ser. No. 119,310

Claims priority, application United Kingdom, Jun. 17, 1984, 8415648; Jun. 29, 1984, 8416688

Int. Cl.[4] G09F 23/00

U.S. Cl. 40—616 **9 Claims**



1. An identification marker for use in permanent identification of a histology sample comprising a plurality of columnar indicia moulded integrally with a base, the indicia extending from the base in a protruding manner, the marker consisting solely of a single mouldable jelly-like material capable of being sliced by microtome and dimensionally sized for embedding within an embedding medium along with a histology sample.

4,893,425

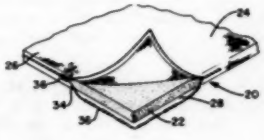
PORTABLE LIGHTWEIGHT DISPLAY BOARD ASSEMBLY

Priscilla M. Ellis, Silver Lake, Ohio, assignor to The McNeilis Company, New Brighton, Pa.

Filed Sep. 6, 1988, Ser. No. 240,528

Int. Cl.[4] G09F 7/06

U.S. Cl. 40—622 **10 Claims**



1. A portable display board assembly comprising:

(a) an essentially rigid rectangular board capable of receiving pins or the like, said board having a thickness substantially less than its width or height;

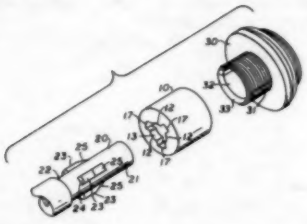
(b) a removable flexible cloth cover adapted to enclose said board and to fit closely thereover, said cover being of generally rectangular shape conforming to that of said board and including a pair of side panels and four edges corresponding, respectively, to the two sides and four edges of the board, said cover having an opening sufficiently large to permit removal of said board without bending, and fastener means for closing said opening.

4,893,426

LUGGED COUPLING APPARATUS

Timothy D. Bixler, Katy, Tex., assignor to South Central Research Corp., Katy, Tex.

Filed Oct. 7, 1988, Ser. No. 255,597
Int. Cl.[4] F41C *21/18, 27/00*
U.S. Cl. 42—75.01 **10 Claims**



1. Coupling apparatus for securing a shaft to an externally threaded member comprising:

a cylindrical collar member having internal threads at one end to be threadedly received on the threaded member and at its other end a series of circumferent'ally spaced internal lugs extending radially inward to define a central opening and a series of circumferential apertures between the internal lugs,

each said collar internal lug having a long longitudinal raised side and a short longitudinal raised side which define inwardly facing recesses therebetween, and

a cylindrical shaft member having a plurality of circumferentially spaced external lugs at one end extending radially outward from the shaft,

said shaft member having a diameter sufficient to be slidably received through the central opening of said collar member and said external lugs configured to be slidably received through the apertures of said collar member and pass over the short side and engage the long side of said collar internal lugs upon relative rotation between said collar and said shaft members, whereby

when said collar member is threaded onto said threaded member in one direction said shaft external lugs will become seated in the recesses of said collar internal lugs and said shaft will be drawn into firm engagement on the threaded member to securely connect said shaft member to the threaded member, and

when said collar member is rotated in the opposite direction relative to the threaded member said shaft external lugs will become unseated from said recesses and pass over the short sides of said collar internal lugs allowing said shaft to be removed from said threaded member and said collar.

4,893,427

TELESCOPING UNIPAD

Arthur Davidson, 3746 F. Rd., Clifton, Colo. 81520

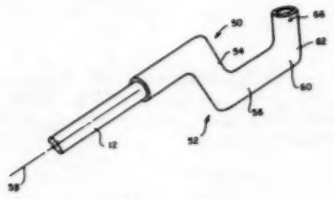
Filed Nov. 10, 1988, Ser. No. 269,444
Int. Cl.[4] F42C *27/00*
U.S. Cl. 42—94 **3 Claims**

1. A firearm support comprising:

(A) a plurality of telescopically engaged tubular members which include a bottom member adapted to rest on a support surface and a double-bent top member adapted to be attached to a firearm, said double-bent top member including a connecting section mounted on one of said tubular members, a first section oriented at an angle with respect to said connecting section and being in a common plane with said connecting section, a first bend connecting said connecting section to said first section, a second section oriented at an angle with respect to said first section and being in said common plane with said first section and said connecting section, a second bend connecting said first section to said second section, a third section oriented at an angle with respect to said second section and being in a second plane that is oriented at an angle with respect to said common plane, and a third bend connecting said third section to said second section, said third section having an outer surface and an end spaced from said third bend;

(B) an attaching means on said top member third section for attaching said top member to a firearm, said attaching means including

(1) a swivel pin mounted on said top member third section adjacent to the end of said top member third section and



extending outwardly of said third section outer surface to define attaching ears,

(2) a U-shaped stirrup attached to said swivel pin attaching ears and mounted thereon to pivot around the end of said top member third section,

(3) a second swivel pin affixed to said stirrup, and

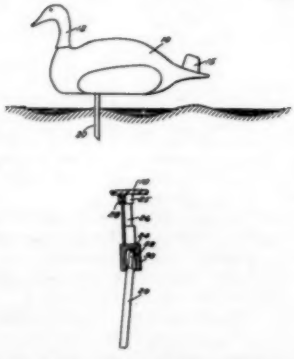
(4) a circular clamp member attached to said second swivel pin to rotatable about said second swivel pin, said clamp member being adapted to encircle the firearm and having a thumbscrew for engaging the firearm to attach said clamp member to the firearm.

4,893,428

SELF-ALIGNING DECOY

Kenneth M. Gagnon, Sr., 4 Mill St., Cumberland, R.I. 02864

Filed Apr. 14, 1989, Ser. No. 338,191
Int. Cl.[4] A01M *31/06*
U.S. Cl. 43—3 **4 Claims**



1. A self-aligning decoy comprising a body in the shape of a bird including a head portion and a body portion; said body portion having a tail portion, a fin mounted on the tail portion substantially along the central portion thereof, said fin extending generally perpendicular to the body, a socket having a spherical end mounted near the center of gravity of the body, said socket opening downwardly towards the bottom portion of the decoy, a stake having a generally cylindrical cross-section with a reduced end portion, said reduced end portion having a pointed end and being received in said socket.

4,893,429

TOP GUIDE FOR A FISHING ROD

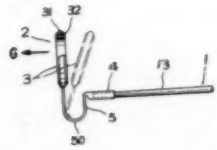
Yoshiro Yamoto, Sakai, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan

Filed Nov. 9, 1988, Ser. No. 268,978

Claims priority, application Japan, Nov. 11, 1987, 62-172989[U]

Int. Cl.[4] A01K 87/04

U.S. Cl. 43—24 2 Claims



1. A top guide adapted to be mountd to the tip of a fishing rod, said top guide comprising:

a mounting portion for mounting on the tip;

a line guide ring for guiding a fishing line adapted to extend along the fishing rod toward the tip; and

a connector interconnecting said mounting portion and said line guide ring, said connector being formed of a plate having a given width, having its widthwise dimension perpendicular to an axial direction of said line guide ring, coupled at one lengthwise end to said mounting portion and at its other lengthwise end to said line guide ring, and having an elastically deformable lengthwise intermediate portion curved in a circular arc shape which is adapted to be elastically displaced in said axial direction thereof but not in a direction perpendicular to said axial direction responsive to an impact applied to said line guide ring to thereby buffer said impact.

4,893,430

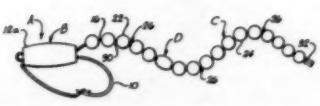
MULTI-JOINTED BEADED FISHING WORM LURE

Timmy R. Barfield, 1304 Collins Park St., Conway, S.C. 29526

Filed Dec. 5, 1988, Ser. No. 279,874

Int. Cl.[4] A01K 85/00

U.S. Cl. 43—42.24 20 Claims



1. A multi-joined fishing lure comprising:

an artificial worm having a head end and a tail end;

a worm head carried at said head end;

a multi-jointed worm body substantially elongated relative to said worm head carried by said worm head; said elongated worm body including a continuous flexible strand, a plurality of generally spherical beads carried individually by said strand in series trailing said worm head, and said spherical beads being generally longitudinally shiftable along said strand facilitating undulating of said worm body during retrieval through the water;

a joint formed between each spherical bead so that said worm body may flex continuously along its length in all directions to simulate the natural motion of a live worm; and

at least one fish hook carried by said worm.

4,893,431

FISHING LURE

Harry M. Ehlers, 5330 E. Kemper Rd., Cincinnati, Ohio 45241

Filed Sep. 6, 1988, Ser. No. 240,530

Int. Cl.[4] A01K 85/00

U.S. Cl. 43—42.47 5 Claims

1. A fish lure, comprising:

(a) a hollow body;

(b) a single piece frame member comprising

(i) a lip extending forwardly from said body, said lip configured to impart action to the lure, said lip having a leading edge; and

(ii) a reach extending rearwardly from said lip, said reach disposed at least partially in said hollow body;

(c) a rib formed in said lip;

(d) a link having an attachment end, a guard portion and a loop, said loop being spaced apart from said attachment end, formed between said attachment end and said guard portion, and configured to be connected to a fishing line, said attachment end being attached to said rib, said guard portion having an operative position in which said guard portion is disposed in front of said leading edge extending at least partially below said leading edge without passing through said lip, and extending generally rearwardly whereby weeds and other similar objects are kept from becoming entangled about said rib and said attachment end.

4,893,432

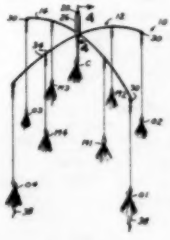
FISHING JIG

Walter H. Rosengrant, HC 68 Box 328A, Kingston, Okla. 73439

Filed Mar. 13, 1989, Ser. No. 322,400

Int. Cl.[4] A01K 91/04

U.S. Cl. 43—42.74 2 Claims



1. A fishing jig, comprising:

a pair of elongated semirigid wires disposed in crossed relation medially their ends,

each wire of said pair of wires having its respective end portion arcuately curved to define a depending line receiving closed loop,

one wire of said pair of wires being doubled back upon itself at the crossed position to define a part circular upstanding loop and extend laterally a selected distance normal to its longitudinal axis,

the other wire of said pair of wires being arcuately curved to form a depending closed loop at the crossed position and similarly doubled back upon itself with its doubled back portion cooperatively received between the doubled back portions of said one wire;

a sleeve surrounding and bonded to the doubled back portions of said pair of wires; and,

a first plurality of fishing lures respectively secured to said depending loops.

4,893,433

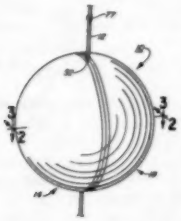
FISHING FLOAT

Clement J. Scheffler, and Marvin L. Scheffler, both of 12233 Ann St., Blue Island, Ill. 60406

Filed Feb. 21, 1989, Ser. No. 313,018

Int. Cl.[4] A01K *93/00*

U.S. Cl. 43—43.1 **2 Claims**



1. A slip bobber for a fishing line comprising:

a pair of separable parts that abut on each other at respective transverse mating surfaces thereof to form a buoyant body;

means forming a transverse groove in the mating surface of one of said parts for slidable reception of a fishing line therein;

said one part including an externally threaded post projecting outwardly from its mating surface;

means forming a longitudinal slot extending transversely through said post for the length of the post and adapted for receiving a fishing line in the slot, said slot registering with said groove for moving a fishing line through the slot and into the groove;

the remaining one of said parts including a resilient flexible transverse wall having a recessed outer surface comprising the mating surface of the part;

means forming an opening in said remaining part wall in register with said post and adapted for receiving the post in the opening in threaded engagement with said wall for bringing said parts into abutment, thereby to confine a fishing line in said groove; and

said remaining part wall being adapted for being stressed by engagement of said post therewith upon said bringing said parts into abutment, thereby to produce a force deforming said transverse wall wherein it becomes substantially planar and the force resiliently urges the abutted parts toward one another.

4,893,434

PEST EXTERMINATING SYSTEM

Richard C. Knipp, 985 Papaya La., Winter Springs, Fla. 32708; Richard R. Schmitt, 292 Wekiva Park Dr., Sanford, Fla. 32771, and Kenneth R. Chitwood, 115 Seminola Blvd., Casselberry, Fla. 32707

Filed May 15, 1989, Ser. No. 352,282

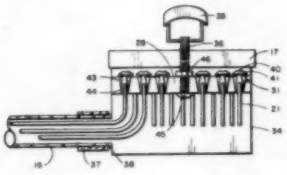
Int. Cl.[4] A01M *7/00*

U.S. Cl. 43—124 **11 Claims**

1. A gas or liquid distribution system in a building for the control of pests in the building comprising:

tube means disposed in the walls of a building and having a plurality of flexible tubes, each tube having a plurality of openings along the side thereof in one open portion thereof and each tube passing into a predetermined building zone;

a control distribution box attached to a building wall and having a panel therein having a plurality of openings passing therethrough and having the open end of each said flexible tube attached to said panel through one said opening therein; and



a plurality of tube end connectors for connecting each flexible tube end to said panel in said control distribution box, each said connector extending into one said panel opening and holding one said flexible tube open end thereto whereby injecting a pest control gas or liquid into an opening in said panel and tube open end will distribute gas or liquid to one zone of a building.

4,893,435

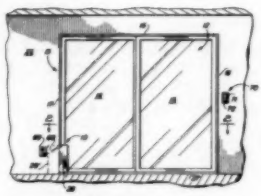
LOW PROFILE SLIDING DOOR OPENER

H. Stanley Shalit, Seminole, Fla., assignor to Remote-A-Matic, Inc., Bradenton, Fla.

Filed Apr. 7, 1989, Ser. No. 335,118

Int. Cl.[4] E05F *15/14*

U.S. Cl. 49—360 **20 Claims**



1. An opener for a closure panel movably mounted to slide along an elongated channel strip across a bottom of a wall opening between "panel closed" and "panel open" positions, said opener comprising:

a housing member in the form of a threshold plate dimensioned, configured and adapted to extend nonintrusively across said bottom of said opening adjacent said channel strip;

a belt;

means for mounting said belt within said housing member for movement along a run longitudinally aligned with said channel strip;

means for attaching said panel to said belt at said run for movement therewith;

a motor; and

means mounting said motor at an elevation above said threshold plate for driving said belt mounting means by said motor to move said belt along said run to move said attached panel between said positions.

4,893,436

FELTED FOAM BACK UP PAD

Larry D. Rich, Oakdale, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 946,367, Dec. 24, 1986, abandoned. This application Feb. 25, 1988, Ser. No. 163,216
Int. Cl.[4] B24B *23/00*
U.S. Cl. 51—170 MT 6 Claims

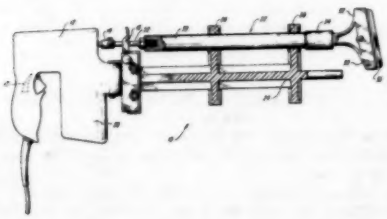
1. A back up pad for incorporation into the drive platen of a vibrating or orbital sander comprising a rectangular rigid back up plate having four spaced points of attachment adapted to be attached to a drive mechanism of the sander, and a rectangular layer of felted polyurethane foam having first and second generally parallel opposite surfaces with said first surface fixed to said back up plate, and said second surface adapted to have a coated abrasive sheet removably adhered thereto, said layer of felted polyurethane foam providing efficient driving force transmission between said first and second surfaces of the pad in a direction parallel to said surfaces to drive a coated abrasive sheet removably adhered to said second surface from driving forces applied at said first surface through said back up plate, and said layer of felted polyurethane foam having a Shore A compression reading measured in a direction normal to said surfaces in the range of about 2 to 20 to provide relatively low resistance to compression in a direction normal to said second surface so that a sander by which the back up pad is driven has little tendency to chatter and bounce on the surface of a workpiece being sanded.

4,893,437

POWER SANDING ADAPTER FOR JIGSAWS

John P. Doherty, 49 Soley St., Charlestown, Mass. 02129

Continuation-in-part of Ser. No. 158,571, Feb. 22, 1988, Pat. No. 4,790,045. This application Apr. 7, 1988, Ser. No. 178,555
Int. Cl.[4] B24B *23/00*
U.S. Cl. 51—170 TL 9 Claims



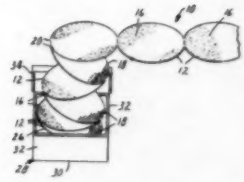
1. A tool attachment for a jigsaw, comprising:
an extension having a foot;
means for clamping the foot to a jigsaw so that the extension is rigidly attached thereto without tilting off the axis of elongation thereof;
an elongated post having a tool attachment end and a remote end;
means for mounting the elongated post to the extension for reciprocating motion with respect to the extension; and
means for fastening the remote end of the elongated post to a chuck of a jigsaw so that the post is moved reciprocally with the reciprocating motion of the chuck of the jigsaw.

4,893,438

FAN FOLDED ABRASIVE DISCS

Richard L. Fry, White Bear Lake; Gerald L. Bergsrud, Maplewood, both of Minn.; Russell J. Maland, Ames, Iowa, and James A. Weldon, Eagan, Minn., assignors to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed Sep. 6, 1988, Ser. No. 245,462
Int. Cl.[4] B24D *11/00*
U.S. Cl. 51—394 12 Claims



1. A concatenation of circular abrasive discs each including a backing having first and second major surfaces, a layer of abrasive material on said first surface, and a multiplicity of loops projecting from said second surface by which said discs may be releasably attached to a drive member having hooks adapted to releasably engage the loops, said discs being cut from a single sheet of stock and each disc being attached to two adjacent discs at opposite edges by two narrow tabs along each edge spaced by at least about 0.32 centimeter (⅛ inch) along said edge and generally equally spaced on opposite sides of a center line extending between the centers of the attached discs, said discs being separated between said tabs and said tabs being folded to position said abrasive discs in a stack with each abrasive disc within the stack having its layer of abrasive material against the layer of abrasive material of one adjacent disc, and its loops against the loops of the other adjacent disc.

4,893,439

ABRASIVE ARTICLE CONTAINING HELICALLY CRIMPED FIBERS

Thomas R. McAvoy, Stillwater, and Fred H. Bland, Woodbury, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 38,062, Apr. 14, 1987, abandoned. This application Aug. 5, 1988, Ser. No. 230,673
Int. Cl.[4] B24D *13/14*
U.S. Cl. 51—400 13 Claims

1. An article suitable for buffing floors consisting of an open,

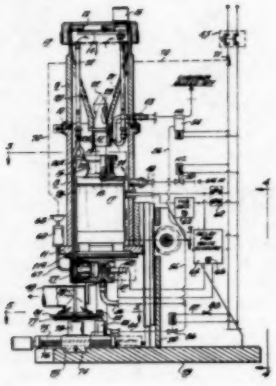
lofty nonwoven web comprising at least 30% by weight of helically crimped, synthetic, organic, staple fibers, said web containing a binder and abrasive particles ranging in grade from about 36 to about 1000.

4,893,440

ABRASIVE JET MACHINING

Ben J. Gallant, Corpus Christi, Tex., and Walter G. Kulischenko, East Brunswick, N.J., assignors to Airsonics License Partnership, Corpus Christi, Tex.

Continuation of Ser. No. 148,387, Jan. 25, 1988, abandoned, which is a division of Ser. No. 858,373, May 1, 1986, Pat. No. 4,733,503. This application May 19, 1989, Ser. No. 355,880
Int. Cl.[4] B24C 7/00
U.S. Cl. 51—436 5 Claims



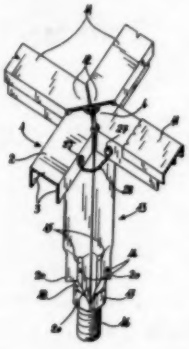
1. Apparatus for developing and handling an abrasive-laden gas stream, comprising a substantially vertical feed tube having an upwardly directed inlet opening at its upper end and having a downwardly directed delivery nozzle at its lower end with a downwardly directed delivery nozzle opening, said vertical tube and said nozzle having coaxial passages, a pneumatically pressurized receptacle in which said upwardly directed inlet opening is exposed, the receptacle having a lower closure through which the feed tube extends, a vibratory feed chamber in said pressurized receptacle, the feed chamber having a delivery duct adapted to feed a stream of particulate material into the upwardly directed inlet opening of said feed tube to provide for carrying the particulate material in a stream of gas downwardly through said tube to a region externally below said pressurized receptacle, the feed tube including vertically and axially aligned rigid tube elements with adjoining ends presented toward and spaced from each other in said region externally below said pressurized receptacle, and a flow shut-off valve in the region of the space between said vertically aligned tube elements, the shut-off device including a vertically extended tube formed of resilient material and having an inside diameter sufficient to engage and telescopically overlap the ends of the vertically aligned tube elements, rigid means surrounding the tube formed of resilient material and rigidly interconnecting the adjoining ends of said vertically aligned tube elements and a shut-off plunger positioned to horizontally pinch the resilient tube in said region below said pressurized receptacle.

4,893,441

LOAD-BEARING STRUCTURE FOR RAISED FLOORS

Cosimo Catalano, Padova, and Paolo Pasto', Piove Di Sacco, both of Italy, assignors to Iceco S.P.A., Piove Di Sacco PD, Italy

Filed Feb. 25, 1987, Ser. No. 19,083
Claims priority, application Italy, Jan. 5, 1985, 41562 A/85
Int. Cl.[4] E04F 15/02
U.S. Cl. 52—126.6 10 Claims



1. A load-bearing structure for raised floors, comprising:

a plurality of rest feet arranged at a mutual distance, each of said rest feet including a tubing section and a ground rest plate, said tubing section having a first end connected to said rest plate, a second, open end opposite to said first end and height adjusting means, said rest plate extending substantially perpendicular to said tubing section,

a plurality of crosspieces, extending between pairs of rest feet and forming a rest grid, each of said crosspieces including a U-like bent sheet element including an upper longitudinal wall and two bent side walls, said upper longitudinal wall having two opposite ends extending each beyond said side walls and having a triangular shape defining two converging sides, each said crosspiece further including hooking means comprising two protruding walls extending from said converging sides substantially parallel thereto and perpedicular to said bent sheet element, said protruding walls extending at a distance from said side walls and defining therewith a pair of slots, said protruding walls being accomodated within said open end of one of said rest feet, with said tubing section partially extending into said slots,

connection means arranged within said tubing sections proximate to said second open end, said connection means having a first portion engaging with said protruding walls of said crosspieces and a second portion engaging with an inner portion of said tubing section for firmly securing said crosspieces to said rest feet, and

a covering structure, overlying said sheet elements.

4,893,442

STAIRWAY APPARATUS AND METHOD OF MANUFACTURE

James M. Graham, Myrtle Beach, and Edward F. Schaack, Greenville, both of S.C., assignors to Duraflite, Inc., Newtown, Conn.

Continuation of Ser. No. 929,826, Nov. 13, 1985, Pat. No. 4,838,005. This application Dec. 28, 1988, Ser. No. 275,970
Int. Cl.[4] E04F 11/00
U.S. Cl. 52—184 10 Claims

1. A stair assembly for a stairwell of a building, the combination comprising:

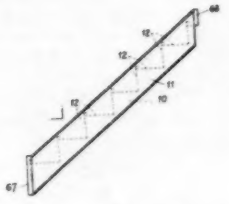
a pair of spaced stringer elements (**10, 11**) each having a support end bar (**66**) affixed at an upper end portion;

a plurality of tread pan riser elements each having portions forming a tread pan portion (**13**) and a frontal flange (**14**) and an inturned flange (**15**) and an angular riser (**16**) and having parallel end edges being welded to a respective one of said stringer elements;

a plurality of tread pad means each being secured to a respective tread pan portion to form a tread pad stair step;

a plurality of support bracket means (**56, 57, 58**), being securely affixed to a portion of the building stairwell;

a support beam (**96**) being supported at opposite end portions upon a respective one (**57, 58**) of said plurality of support bracket means;



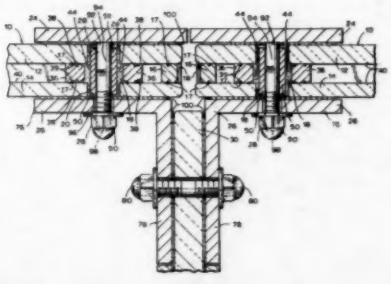
a prefabricated landing means (**50**) having four sections of angle irons (**80-83**) welded together to form an open bottom box means (**85**), a corrugated decking bottom member having lower protrusions (**88**) supported upon and secured to one or more horizontal reach portions (**90**) of said angle irons, and having one or more angle brackets (**94**) affixed to an interior portion of one or more vertical reach portions of said angle irons (**80-83**) at a predetermined step pad level, and having a concrete step pad member (**92**) precast within said box means (**85**) atop said corrugated decking bottom member, whereby said landing means being supported at a rear portion upon a respective support bracket means (**56**) and at a front portion upon said support beam (**96**) and whereby said support end bars (**66**) are supported on a portion of said support beam (**96**).

4,893,443

SEALED DOUBLE GLAZING UNIT

Ronald Haber, Chestnut Ridge, N.Y., assignor to W & W Glass Products Ltd., Spring Valley, N.Y.

Filed Jan. 18, 1989, Ser. No. 298,635
Int. Cl.[4] E06B *3/00*
U.S. Cl. 52—208 **23 Claims**



1. A sealed double glazing unit comprising:

(A) an outer pane and an inner pane, each defining in at least one corner thereof an aperture therethrough, said pane apertures being axially aligned;

(B) peripheral sealing means about the periphery of said panes; and

(C) means, disposed in said at least one corner of said panes, for enabling mounting of said unit to a supporting member, including

(i) a torus having opposed end surfaces and a sidewall connecting said end surfaces and defining a hole, said torus extending between said panes coaxially with said pane apertures and having the end surfaces of said torus secured to facing surfaces of said panes about said pane apertures,

(ii) a sleeve extending through said hole of said torus and having its end portion disposed at least partially within respective ones of said pane apertures, and

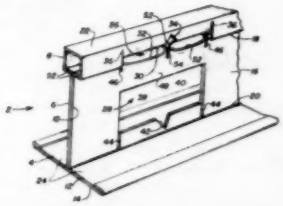
(iii) sealant securing the outer surface of said sleeve to the inner surface of said torus.

4,893,444

FIRE EXPANSION JOINT FOR CEILING RUNNER

James C. Ollinger, Lancaster, and Daniel C. Ziegler, Millersville, both of Pa., assignors to Armstrong World Industries, Inc., Lancaster, Pa.

Filed May 2, 1988, Ser. No. 189,188
Int. Cl.[4] E04C *2/42*; E04B *5/50*
U.S. Cl. 52—232 **4 Claims**



1. An expansion runner for a ceiling system comprising:

(a) a vertical web member with upper and lower ends;

(b) said vertical web member having an enlarged bulb at its upper end and a horizontal flange extending from both sides of its lower end;

(c) said runner having an upper elongated opening adjacent the upper end of the web and, said runner having a lower elongated opening positioned in the vertical web intermediate the upper and lower ends of the vertical web;

(d) the upper and lower openings having a length taken along the length of the runner selected to accommodate anticiapted axial expansion of the runner upon exposure to a fire;

(e) the improvement comprising:

(1) said upper elongated opening extends from the upper end of the web into the enlarged bulb, the upper elongated opening having upper and lower edges, said upper edge having only one triangular notch therein with the notch positioned at the midpoint of the upper edge and extending to almost the top of the enlarged bulb, at each end of the upper edge a straight line cut with abutting edges extends from the upper opening toward and to almost the top of the enlarged bulb, and

(2) said lower elongated opening having upper and lower margins, said upper margin being spaced from the lower edge of the upper elongated opening, said lower margin having only one triangular notch therein with the notch positioned at the midpoint of the lower margin and extending to adjacent the horizontal flange, at each end of the lower margin a straight line cut with abutting edges extends from the lower opening toward and to almost the top of the horizontal flange.

4,893,445

CONSTRUCTION SYSTEM

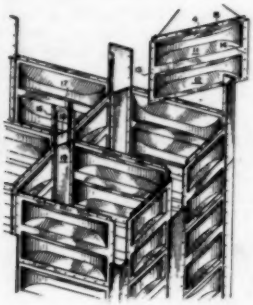
Hans G. Hefer, New South Wales, Australia, and Jurgen Schneider, Schaumenstein, Fed. Rep. of Germany, assignors to M.A.H. Construction & Engineering Pty-Ltd., Smithfield, Australia

Continuation of Ser. No. 894,291, Aug. 7, 1986, abandoned. This application Apr. 28, 1988, Ser. No. 188,170

Claims priority, application Australia, Aug. 7, 1985, PH01829

Int. Cl.[4] E04H 7/30

U.S. Cl. 52—234 **4 Claims**



1. A silo comprising a plurality of support columns and walls,

each of said walls including at least one wall plate having profiled strengthening sections and flat flanges around its periphery, said flat flanges having first boreholes for receiving attaching means, wherein at least one said flange is offset on at least one peripheral edge of said wall plate,

each of said support columns being formed by at least one plate-shaped building element, said building element comprising a column plate having a flange at each opposite longitudinal edge thereof, said flanges being at approximately 45 degrees from said plate, the included angle between the flanges being approximately 90 degrees, said flanges having second boreholes for receiving attaching means,

wherein a flat flange of each of said wall plates is sandwiched between a flange of a

said building element and an additional flange of an additional said building element selected from the group consisting of a second said building element, a flat-surfaced building element having said additional flange at a longitudinal edge thereof, and a right-angled building element having said additional flange at a longitudinal edge thereof, said additional flange having third boreholes for receiving attaching means, such that said first, second and third boreholes align to receive attaching means, and

wherein said offset allows said wall plate to abut a second wall plate, said first boreholes of said wall plates aligning to receive attaching means.

4,893,446

RELOCATABLE VERTICAL OR HORIZONTAL WALL SYSTEM

Edgar Gudmundsson, Vesturberg 49, and Oli J. Asmundsson, 111 Reykjavik, both of Iceland, Iceland

Filed Nov. 13, 1987, Ser. No. 119,875

Int. Cl.[4] E04H 3/00

U.S. Cl. 52—238.1 **6 Claims**

1. A modular, selectively alterable wall system comprising;

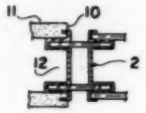
a plurality of adjacent wall sections,

each said wall section including a pair of spaced apart panel members each provided with inner and outer surfaces and having peripheral edges,

a profile element engageable with laterally adjacent ones of said peripheral edges of each said pair of panel members of each said wall section, each said profile element including a substantially planar central web having inner and outer faces bounded by lateral edges and extending transversely of said pair of panel members, said web defining the majority width of said profile element,

a U-shaped channel at each said web lateral edge normal to said web and projecting from said inner face, each said channel comprising inside and outside walls defining a first groove therebetween accessible from the direction of said web outer face,

an outermost flange joined to each said channel outside wall by a base element and defining a second groove therebetween accessible from the direction of said web inner face, said second grooves having a width substantially greater than that of said first grooves, said outermost flanges parallel to said channel outside walls,



said profile element second grooves engageable with said peripheral edges of said spaced apart pair of panel members of one said wall section with at least a portion of the thickness of each said panel member disposed between each said outermost flange and channel outside wall,

a pair of rigid planar splines each having first and second opposite edges with said spline first edges respectively slidably disposed within said first grooves of one said profile element as engaged with said pair of panel members of one said wall section,

said panel members in at least one of said plurality of wall sections comprising wallboards,

said panel members in at least another one of said plurality of wall sections comprising glass,

said second edges of said pair of splines slidably disposed within said first grooves of one said profile element of another, adjacent wall section, whereby,

the distance between adjacent ones of said wall sections is variable depending upon the disposition of and dimension of said splines within respective ones of said first grooves.

4,893,447

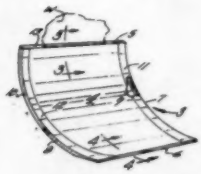
CYCLORAMA CONSTRUCTION

Ronald E. Opp, 12122 SW. Tualitan La., Beaverton, Oreg. 97005, and Frederick W. von Tagen, 1102 Schaeffer Rd., West Linn, Oreg. 97068

Filed Feb. 1, 1988, Ser. No. 150,839

Int. Cl.[4] E04B 1/32

U.S. Cl. 52—288 **1 Claim**



1. Coves for linear abutting installation between horizontal and vertical supports to provide curved surfaces therebetween, each of said coves comprising,

a curved sheet of concavo-convex shape having an upper edge and a lower edge parallel to one another and curved side edges, said sheet having a lower portion of increased thickness to support momentary loads applied thereto and to receive a cove anchoring device in a recessed and concealed manner, side flanges integral with the sheet along the curved side edges thereof, said side flanges adapted for abutment with and attachment to the side flanges of adjacent coves, said side flanges being truncated so as to terminate rearwardly from said lower edge of the sheet to permit said lower edge to rest on and be supported by the horizontal support,

at least one of the parallel edges having a flange therealong for securement to one of said supports, and

said curved sheet having concave recessed marginal areas contiguous with and extending the length of said curved side edges, said marginal areas of the sheet are for the reception of deposited cementious material so that the material will overlie abutting curved side edges of adjacent coves to conceal same.

4,893,448

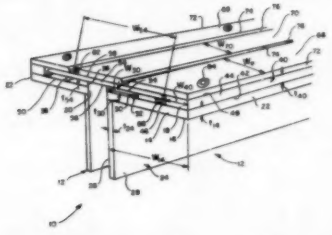
STEEL EXPANSION JOINT

Wilbert McCormick, 2039 Swanson Ave., Suite 2E, Lake Havasu City, Ariz. 86403

Filed Feb. 23, 1989, Ser. No. 313,856

Int. Cl.[4] E01C *11/12, 11/04*

U.S. Cl. 52—396 **10 Claims**



1. An expansion joint structure for use in conjunction with a variable width expansion gap between two structural sections of a roadway, a bridge, a building or the like, which are subject to expansion and contraction due to temperature changes and the like, comprising:

(A) two monolithic steel L-shaped expansion joint structure portions, each being fixedly attached to an associated structural section of two structural sections which are spaced apart to define an expansion gap, each including

(1) a first leg having a bottom face in abutting contact with said associated structural section, a top face , a thickness dimension as defined between said first leg bottom face and said first leg top face, a first edge located adjacent to said expansion gap, a second edge located to be spaced from said expansion gap, and a width dimension as defined between said first leg first and second edges,

(2) a second leg having one edge attached to said first leg adjacent to said first leg first edge and extending into said expansion gap, said second leg including a rear surface in abutting contact with said associated structural section and a front surface facing into said expansion gap;

(B) two monolithic steel plate portions each including

(1) a first surface in abutting contact with an associated L-shaped portion first leg top surface, a top surface, a thickness dimension as measured between said plate portion top surface and said plate portion bottom surface, a first edge located adjacent to said L-shaped portion first leg first edge, a second edge located to be spaced from said plate first edge, and a width dimension as measured between said plate portion first edge and said plate portion second edge,

(2) fastening means fixedly attaching said each plate portion to said associated L-shaped portion first leg;

(C) two monolithic steel spacer plates each including

(1) a bottom surface in abutting contact with an associated one of said L-shaped plate portion first legs, a top surface, a thickness dimension as measured between said each spacer plate top surface and said each spacer plate bottom surface, a first edge located adjacent to said L-shaped portion first leg second edge, a second edge spaced from said each spacer plate first edge, a width dimension as measured between said each spacer plate first edge and said each spacer plate second edge,

(2) said each spacer plate second edge being spaced from a second edge of an adjacent plate portion to define a channel;

(D) a monolithic steel expansion gap spanner plate having a bottom surface slidably resting on said spacer plate top surfaces, a top surface and a thickness dimension as measured between said spanner plate top surface and said spanner plate bottom surface;

(E) said each spacer plate thickness being essentially equal to the combined thicknesses of said each plate portion and said expansion gap spanner plate whereby said expansion gap spanner plate top surface and said spacer plate top surfaces are essentially co-planar; and

(F) two monolithic steel cover plates, each including a bottom surface fixedly attached to a top surface of a spacer plate associated therewith and slidably resting on the top surface of said gap spanner plate adjacent to one edge of said expansion gap spanner plate, each of said cover plates extending over an associated channel of said channels to close both of said channels and engaging said expansion gap spanner plate to control movement of said expansion gap spanner plate.

4,893,449

REMOVABLE BRIDGE PROFILE FOR FLOOR JOINTS

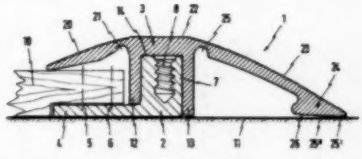
Hans A. Kemper, D-5883 Kierspe 1, Webestrasse 19, Fed. Rep. of Germany

Filed Dec. 16, 1988, Ser. No. 285,083

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1987, 3743895

Int. Cl.[4] E04F *15/14*

U.S. Cl. 52—464 **9 Claims**



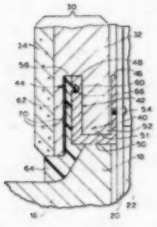
1. Removable bridge profile for floor joints, in particular of parquet floors with different vertical position of the joint edges, consisting of an L-shaped base profile with a threaded drive channel projecting into the joint, at least one covering wing adjoining a center portion covering the joint and drive screws, wherein the improvement comprises a drive channel having a pair of vertical upstanding walls with planar outer vertical surfaces to form a vertical leg of said L-shaped base profile, and the lower side of the center portion comprises two parallel webs engaging over the planar outer vertical surfaces of the threaded drive channel.

4,893,450

WATERTIGHT FASTENER

Barry G. Donaldson, Yorktown, N.Y., and Joseph H. Newman, West Orange, N.J., assignors to Tishman Research Corporation, New York, N.Y.

Filed Feb. 23, 1988, Ser. No. 159,108
Int. Cl.[4] E04B *2/72*; E04C *2/46*
U.S. Cl. 52—506 **15 Claims**



1. In combination:

(A) a prefabricated surround panel defining at the base thereof intermediate the front and back thereof a peripherally-opening groove; and

(B) a watertight fastener for mounting said surround panel on a wall comprising:

(i) a rigid support member having a mounting portion and a surround-receiving portion, said mounting portion being secured to the wall and said surround-receiving portion being within said peripheral groove of said surround panel; and

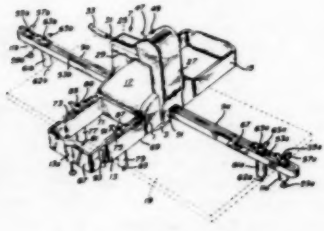
(ii) a unitary one-piece resilient seal member having an elongate body portion and a sealing portion, said body portion and said surround-receiving portion extending into said peripheral groove of said surround panel, said body portion having a first surface abutting a surface of said surround-receiving portion and a serrated second surface abutting a surface of said peripheral groove of said surround panel, and said sealing portion extending intermediate said surround panel and an adjacent surface to form a watertight seal therebetween.

4,893,451

APPARATUS FOR LAYING TILES

Pietro Valente, Windsor, Canada, assignor to Antonietta Investments Ltd., Windsor, Canada

Filed Sep. 17, 1987, Ser. No. 97,579
Claims priority, application Canada, Sep. 18, 1986, 518519
Int. Cl.[4] E01C *19/14*
U.S. Cl. 52—749 **8 Claims**



1. Apparatus for laying tiles on a surface in a predetermined arrangement, wherein each tile is laid individually at a given distance from neighboring, already laid tiles, which comprises

an enclosure;

holding means mounted on said enclosure for holding a tile over a surface portion covered with an adhesive material, said surface portion being intended to receive said tile, said holding means further permitting said tile to contact said adhesive material;

a pair of extendable arms laterally extending from said enclosure on front and back sides thereof;

an adjustable leg at the end of each of said arms, wherein one of said adjustable legs is placed on a tile which has been laid while the other of said legs is directly placed on said surface portion;

joint spacers dependent from each of said arms and parallel with said legs for correctly spacing a tile relative to adjoining tiles so as to form a joint of predetermined width between adjoining tiles;

vibration means associated with said enclosures and operative when said tile is in contaCt with said surface portion covered with said adhesive material, said vibration means causing said tile to become embedded in said adhesive material and become fixed on said surface portion; and

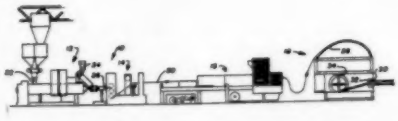
releasing means enabling said holding means to release said tile after said tile has been fixed on said surface portion.

4,893,452

METHOD FOR MAKING A TAMPER-EVIDENT, DIFFERENTIAL PRESSURE-THERMOFORMED LIDDED PLASTIC CONTAINER

Robert Bruce, and Robert W. Whitney, both of Litchfield, Ill., assignors to CPC-Rexel, Inc., St. Louis, Mo.

Division of Ser. No. 81,695, Aug. 4, 1987, Pat. No. 4,836,407.
This application Nov. 15, 1988, Ser. No. 275,729
Int. Cl.[4] B65B *7/28*, *61/18*
U.S. Cl. 53—420 **23 Claims**



1. A method for making a tamper-evident lid for a container body having an upstanding peripheral sidewall providing a mouth defined at least in part by a rim having an outer portion which projects downwardly and terminates in a lower end, comprising:

providing a sheet of thermoplastic resin;

differential pressure-thermoforming a site on said sheet to provide a potential lid having a central disk-shaped portion perimetrically surrounded by an inverted U-shaped channel portion having a radially inner wall, a top wall and a radially outer wall;

providing a circumferentially extending radially inwardly convex bulge in said radially outer wall of said U-shaped channel portion at an axially intermediate level thereon;

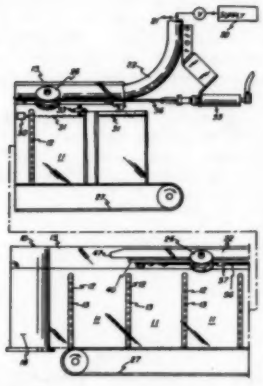
while supporting said U-shaped channel portion against axial collapse, mechanically compressing said radially outer wall below said convex bulge axially towards said top wall and thereby telescoping and permanently deforming said convex bulge to provide a barb which projects inwardly towards said inner wall of said U-shaped channel portion sufficiently to catch under said lower end of said rim, when said channel portion is pushed onto said container body so as to enclose said rim from above, with sufficient interference as to normally prevent non-destructive removal of said channel portion from said container body.

4,893,453

PACKAGING SYSTEM AND METHOD

Roy J. Welkert, c/o Asepak Corporation, 1915 E. Simpson Ave., Suite #1, Fresno, Calif. 93703-1043

Filed Jan. 24, 1989, Ser. No. 301,197
Int. Cl.[4] B65B 3/04, 7/06, 43/52
U.S. Cl. 53—469 9 Claims



9. The method of packaging fluent material in successive pouches of material which comprises the steps of:

(a) supplying a continuous web of pouches consisting of a closed tube having upper and lower edges and spaced seam lines extending upwardly to a level spaced from said tube upper edge to form a series of pouches which are interconnected at the tops thereof by an integral tubular portion of said web and which are individually open to said tubular portion but are sealed from each other by said seam lines extending along the adjacent sides thereof,

(b) inserting in said tubular portion an elongated filling pipe having a discharge end provided with two outlet ports in the underside thereof,

(c) drawing said web along said pipe with said pipe received in said tubular portion thereof,

(d) continuously supplying material to be packaged to said pipe for discharge therefrom through said outlet ports,

(e) alternately opening and closing said outlet ports in timed relation with said drawing movement of said web whereby each of said ports is open only when one of said pouches is passing thereunder and is closed when one of said seam lines is thereunder, and

(f) containing said material in each of the resulting filled said pouches by sealing said tube along a line intersecting said seam lines adjacent the upper ends thereof.

4,893,454

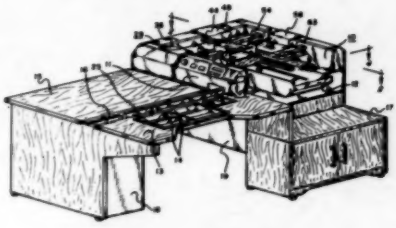
ENVELOPE OPENING MACHINE AND METHOD

Robert J. Russell, Marlton, N.J., assignor to Comtrex Systems Corporation, Moorestown, N.J.

Filed May 6, 1988, Ser. No. 191,952
Int. Cl.[4] B65B 43/30
U.S. Cl. 53—492 22 Claims

1. The method of facilitating the extraction of the contents of envelopes which have been opened on three sides comprising:

providing at least a partial crease in at least one envelope panel along a line generally between the opened edges of



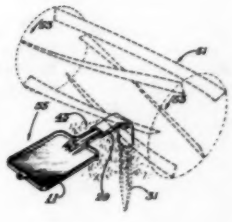
the envelope to deform the envelope panel to leave the contents of the envelope exposed for easy extraction.

4,893,455

BENDABLE MARKER AND METHOD OF MARKING

Robert K. Hughes, Fort Meyers, Fla., assignor to Hughes Enterprises, Ft. Worth, Tex.

Division of Ser. No. 190,482, May 5, 1988, Pat. No. 4,862,823.
This application Apr. 24, 1989, Ser. No. 342,168
Int. Cl.[4] A01D 45/00
U.S. Cl. 56—1 3 Claims



1. A method of mowing grass with a grass mower in the vicinity of a post, comprising the steps of:

providing the post with a shaft with an upper end and a lower end;

providing the post with a stake with an upper end;

providing the post with a flexible elastomeric element with an upper and lower end;

coupling said lower end of said shaft to said upper end of said flexible element;

coupling said upper end of said stake to said lower end of said flexible element;

inserting said stake into said grass area at said selected location to a depth that positions the top of said stake substantially level with the surface of said grass area and positions a lower portion of said elastomeric element below the surface of said grass area; and

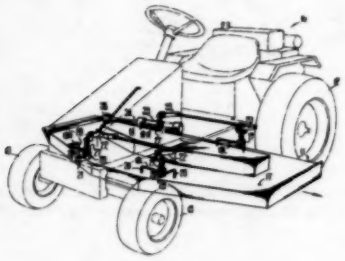
passing said grass mower over said stake, contacting said shaft with the grass mower and bending said shaft downward at said elastomeric element into a position substantially flat on the grass area.

4,893,456

TRACTOR WITH SHIFTABLE MOWING DECK

Robert H. Wallace, 136 Greenwood Dr., Cumming, Ga. 30130

Filed Apr. 21, 1988, Ser. No. 184,114
Int. Cl.[4] A01D *34/64*
U.S. Cl. 56—15.5 6 Claims



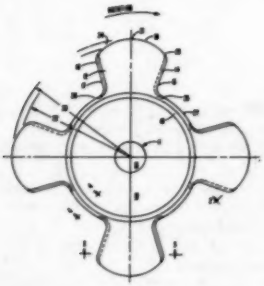
1. Mowing machine comprising:
a vehicle including front wheels and rear wheels for traversing a selected path;
mowing means supported by the vehicle at a longitudinal location between the front and rear wheels, and operative to mow a swath as the vehicle travels along the path;
motive means operatively associated with the mowing means to shift the mowing means laterally between a first lateral position and a second lateral position longitudinally located between the front and rear wheels, relative to the selected path,
the mowing means in the first lateral position being substantially centered relative to the vehicle wheels, and in the second lateral position extending laterally beyond the vehicle wheels alongside the vehicle to displace the mowing swath relative to the path traveled by the vehicle.

4,893,457

SAFETY BLADE FOR ROTARY GRASS TRIMMERS

Joseph S. Castain, 771 N. Market St., Opelousas, La. 70570

Filed Oct. 28, 1988, Ser. No. 264,075
Int. Cl.[4] A01D *55/18*
U.S. Cl. 56—295 6 Claims



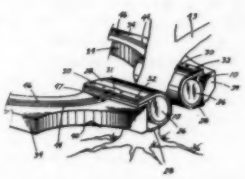
1. A safety blade for use with rotary grass trimmers for cutting grass and weeds around sidewalks, curbs, fence posts, other unyielding objects and loose debris, such as gravel, twigs and stones, comprising:
(a) a disc shaped body;
(b) a means for attaching said body at its center to the shaft of a rotary trimmer for rotation of said blade in a spinning manner;
(c) a plurality of vanes mounted to said body and extending radially from the center of said body, each vane being uniformly separated spacedly from the other and having a leading edge in the direction of rotation of said blade said leading edge having a proximal end and a distal end;
(d) a curved rounded outside radial edge for each vane adjacent to said leading edge having a varying radius along said radial edge from the center of said body, said varying radius being a minimum where said outside radial edge and said leading edge meet so as to allow said rounded outside radial edge to bump against said unyielding objects and loose debris as the blade rotates, nudging said blade away from the unyielding object and loose debris; and
(e) a cutting area along said leading edge of each vane for cutting grass and weeds coming between said vanes during rotation, said cutting area being upwardly beveled to eliminate lifting and throwing of loose debris by the spining blade;

4,893,458

LIQUID COOLED SHAKER PAD RETAINING SLING

Ira Compton, 2434 Dayton Rd., Chico, Calif. 95928

Filed Jan. 27, 1988, Ser. No. 148,919
The portion of the term of this patent subsequent to Jul. 19, 2005, has been disclaimed.
Int. Cl.[4] A01D *46/26*
U.S. Cl. 56—340.1 9 Claims



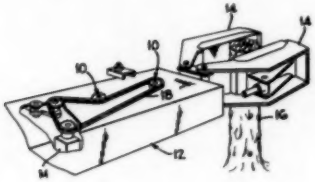
1. A shaker sling for mounting a shaker pad on a shaker arm of a fruit tree shaking harvester machine, with said sling being liquid cooled to reduce the frequency of required greasing, comprising:
a substantially flat rectangular-shaped panel structured of at least two members of flexible but firm synthetic rubber material fastened one on top of the other;
said panel provided with at least one fluid circulating channel manufactured into at least one of said two members;
said panel provided with fluid inflow and outflow apertures in communication with said fluid circulating channel;
said fluid circulating channel sufficiently of a closed nature to be charged with and retain a liquid coolant;
a fluid inflow tube attached to said inflow aperture at one end, the opposite end of said fluid inflow tube attached to a liquid cooling means for cooling said liquid coolant;
a fluid outflow tube attached to said outflow aperture at one end, the opposite end of said fluid outflow tube attached to said liquid cooling means;
means for causing said liquid coolant to course directionally from said liquid cooling means through said fluid inflow tube, through said fluid circulating channel and return to said liquid cooling means through said fluid outflow tube;
means for attaching said panel to said shaker arm of said harvester machine with said panel wrapped around and retaining said shaker pad.

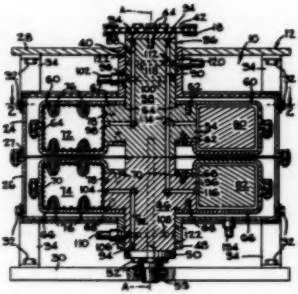
4,893,459

VARIABLE FORCE SHAKER

Franklin P. Orlando, Morgan Hill, Calif., assignor to FMC Corporation, Chicago, Ill.

Filed Jul. 11, 1988, Ser. No. 217,260
Int. Cl.[4] A01D 46/00
U.S. Cl. 56—340.1 15 Claims





1. A variable force shaking head comprising:

means for rotating an eccentrically weighted member about a shaft having an axis;

means for supporting a movable weight on said eccentrically weighted member, and

means for movign said movable weight about said axis between a position in balance with said eccentrically weighted member for precluding shaking about said axis, and a plurality of selected unbalanced positions about said axis to impart a shaking action of different insensities to said shaft.

4,893,460

BELT TYPE SPINDLE DRIVE FOR TEXTILE MACHINES

Horst Wolf, Albershausen, Fed. Rep. of Germany, assignor to Zinser Textilmaschinen GmbH, Fed. Rep. of Germany

Filed Jan. 26, 1989, Ser. No. 302,449
Claims priority, application Fed. Rep. of Germany, Jan. 26, 1988, 3802200
Int. Cl.[4] D01H 1/241; F16H 7/02
U.S. Cl. 57—105 19 Claims

1. A belt type spindle drive apparatus for textile machines of the type having a plurality of simultaneously driven aligned spindles arranged in at least one row, comprising:

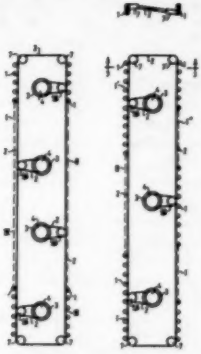
an endless belt extending along said spindles in driving engagement therewith;

a plurality of belt driving devices, each belt driving device including

a drive roller offset from said aligned spindles and around which said belt is trained for driving said belt,

a drive motor for drivingly rotating said drive roller,

an input guide roller intermediate the ends of said row of spindles for guiding said belt from driving alignment with a spindle in said row to said drive roller, and



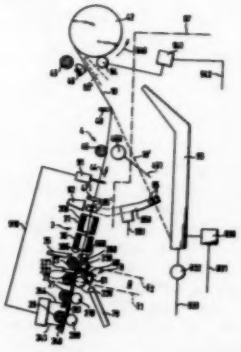
an output guide roller intermediate the ends of said row of spindles for guiding said belt from said drive roller into driving engagement with a spindle in said row.

4,893,461

PROCESS AND DEVICE FOR PIECING WITH A SPINNING DEVICE OPERATING WITH A PNEUMATIC TWISTING UNIT

Peter Artzt; Harald Dallman, both of Reutlingen; Kurt Ziegler, Kirchheim-Nabern, and Gerhard Egbers, Reutlingen, all of Fed. Rep. of Germany, assignors to Schubert & Salzer Maschinenfabrik Aktiengesellschaft, Ingolstadt, Fed. Rep. of Germany

PCT No. PCT/DE88/00106, § 371 Date Dec. 22, 1988, § 102(e) Date Dec. 22, 1988, PCT Pub. No. WO88/06650, PCT Pub. Date Sep. 7, 1988
PCT Filed Mar. 2, 1988, Ser. No. 272,990
Claims priority, application Fed. Rep. of Germany, Mar. 2, 1987, 3706728
Int. Cl.[4] D01H 15/00, 15/02, 5/28
U.S. Cl. 57—261 69 Claims



1. Process for piecing with a spinning device operating with a pneumatic twisting unit downstream from drawing equipment having at least one pair of output rollers on an output side thereof, so that a yarn end is back-fed from the output side of the twisting unit through the twisting unit to the drawing equipment and is then inserted laterally into the pair of drawing equipment output rollers, from where it is subsequently drawn off through the twisting unit in the form of a continuous

yarn while a rove is incorporated into it, such process including conveying the yarn end through the twisting unit located after the pair of drawing equipment output rollers to the twisting unit input side, seizing the yarn end there at such unit input side and conveying the yarn end to a grasping device located at the side of the drawing equipment, which grasping device then pulls the yarn end past the drawing equipment for subsequent insertion into the pair of output rollers.

19. Device for piecing on a spinning apparatus equipped with a pneumatic twisting unit, situated downstream from a pair of output rollers of drawing equipment, comprising a back-feeding element to back-feed a free yarn end from the output side of the twisting unit to its input side, a grasping device to pull back the yarn end from the input side of the twisting unit past said pair of drawing equipment output rollers until it is at the side of the drawing equipment, and a yarn presenting device for seizing the yarn end emerging from the input side of the twisting unit during back-feeding and for conveying it to said grasping device.

4,893,462

OPEN-END SPINNING MACHINE AND PROCESS FOR THE START-UP OF SUCH A DEVICE

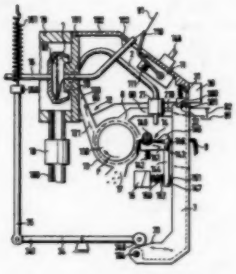
Erwin Braun, and Eberhard Grimm, both of Ingolstadt, Fed. Rep. of Germany, assignors to Schubert & Salzer Maschinenfabrik Aktiengesellschaft, Ingolstadt, Fed. Rep. of Germany

Filed Aug. 3, 1988, Ser. No. 227,816

Claims priority, application Fed. Rep. of Germany, Aug. 10, 1987, 3726531

Int. Cl.[4] D01H *7/885, 15/02*

U.S. Cl. 57—302 **30 Claims**



1. An open-end spinning machine, having a plurality of open-end spinning devices, each of which has an open-end spinning rotor and means to clean the inner surface of said rotor with a compressed air current when said device stops for piecing a broken end, said cleaning means having a cleaning conduit for directing said current of compressed air onto the inner surface of said rotor, said conduit being connected to a pressurized source of air and to pressure control means for alternating the pressure of the air in said cleaning conduit, said pressurized source comprising:

(a) a main conduit connected to each of the cleaning conduits of said open-end spinning devices to convey compressed air from said source to said cleaning conduits; and

(b) stop valve means disposed in each of said cleaning conduits for selectively directing a current of said compressed air onto the inner surface of the rotor of selected open-end spinning devices to dislodge fibers from said inner surface and to clean said rotor.

4,893,463

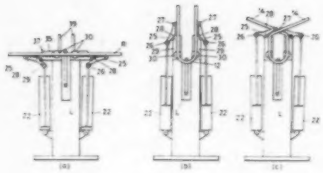
PRICKLE CHAIN DEVICE AND METHOD OF PRODUCTION THEREOF

Lyell J. Woolford, P.O. Box 66, Kimba 5641, South Australia, Australia

Filed Sep. 22, 1988, Ser. No. 247,932

Int. Cl.[4] B21L *1/00*

U.S. Cl. 59—27 **6 Claims**



6. A method of producing a link of a chain, comprising engaging an intermediate portion of a rod with the primary links of two rod engaging means each of which comprises a primary link, an outer link, pivot means joining the primary and outer links, and a piston/cylinder assembly operatively coupled to one end of the outer link,

actuating both said piston/cylinder assemblies simultaneously to form the rod to a "U" shape,

inhibiting further movement of the primary links when the rod is of said "U" shape, but continuing actuation of the piston/cylinder assemblies to continue movement of the outer links and thereby deform the projecting portions of the "U" shape rod to cross one another and project outwardly from one another.

4,893,464

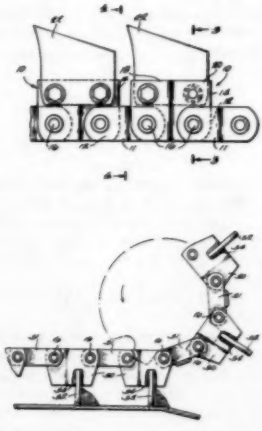
OFFSET ATTACHMENT SIDEBAR CHAIN

John H. Thuerman, West Allis, Wis., assignor to Rexnord Corporation, Milwaukee, Wis.

Filed Dec. 2, 1988, Ser. No. 279,528

Int. Cl.[4] F16G *13/06*

U.S. Cl. 59—78 **21 Claims**



1. An offset sidebar chain comprising:

pairs of offset sidebars having heights perpendicular to the direction of chain travel when said chain is in use, at least one pair of offset sidebars of the chain having an extended

height and each of the sidebars including a first portion having opposite ends, each of said pairs of sidebars having a forward end adapted to be connected by a chain pin to a preceding pair of sidebars and a rearward end adapted to be connected by another chain pin to a trailing pair of sidebars, and said pair of extended height sidebars each including an extended height portion having structure for supporting a tool,

each sidebar of said pair of extended height sidebars including a continuous offset bend extending through the first portion thereof and continuing through the extended height portion thereof, such that both the first portion and the extended height portion include a continuous offset bend,

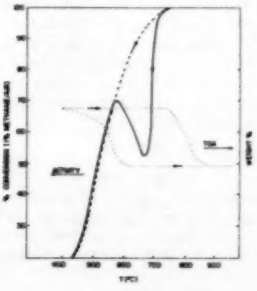
a tool fastened to said extended height portion of said pair of extended height sidebars.

4,893,465

PROCESS CONDITIONS FOR OPERATION OF IGNITION CATALYST FOR NATURAL GAS COMBUSTION

Robert J. Farrauto, Westfield; Teresa Kennelly, Belle Mead, and Earl M. Waterman, Vailsburg, all of N.J., assignors to Engelhard Corporation, Edison, N.J.

Filed Aug. 22, 1988, Ser. No. 234,660
Int. Cl.[4] F23R *3/40*
U.S. Cl. 60—39.02 **19 Claims**



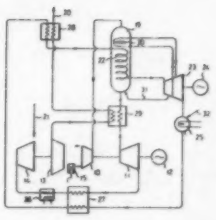
1. A process for starting a combustion system to catalytically combust carbonaceous fuels with air in a combustor in the presence of a palladium oxide containing catalyst, which comprises utilizing a flow of hot gases from a preburner to heat said catalyst to a first temperature in excess of the decomposition temperature of the catalyst, said decomposition temperature at atmospheric pressure being at least about 800° C., and thereafter reducing the flow of hot gases from the preburner while supplying air and fuel for combustion to the combustor downstream of said preheater, and thereafter restoring catalytic activity by lowering the temperature of the catalyst into a regenerating temperature range which at atmospheric pressure is from about 530° C. to about 650° C. and maintaining the temperature within that range until desired catalytic activity is achieved and thereafter maintaining the catalyst below about 800° C.

4,893,466

METHOD OF OPERATING A GAS TURBINE UNIT

Roland Egnell; Ben Kyrklund; Svante Stenfors, all of Finspang, Sweden, and Henrik Harboe, Copenhagen, Denmark, assignors to Asea Stal AB, Finspang, Sweden

Continuation of Ser. No. 43,967, Apr. 29, 1987, abandoned. This application May 15, 1989, Ser. No. 355,038
Claims priority, application Sweden, Apr. 29, 1986, 8602003
Int. Cl.[4] F02C *6/18*
U.S. Cl. 60—39.03 **1 Claim**



1. Method of operating a gas turbine unit for power generation on an electrical power grid for maximum efficiency minimizing polluting emissions and controlling accurately rotational speed within predetermined limits comprising a combustion chamber, a high pressure turbine, a high pressure compressor driven by said high pressure turbine, a low pressure turbine, said low and high pressure turbine being in fluid communication through adjustable flow control vanes and a low pressure compressor driven by said low pressure turbine, said high pressure and low pressure compressors being connected in series, the method comprising the steps of:

(a) supplying pressurized air from the compressors to the combustion chamber;

(b) adjusting the useful power of the gas turbine unit by controlling the gas condition upstream of the low pressure turbine;

(c) utilizing substantially all of the air delivered to the combustion chamber from the compressors for the combustion in the combustion chamber;

(d) cooling the gas generated in the combustion chamber by producing steam from water heated by the gas in a system separated from the gas to a temperature which corresponds to the maximum operating temperature of the high pressure turbine to limit formation of polluting emissions;

(e) utilizing the power of said steam in a steam turbine by said cooling of the generated gas;

(f) recovering the useful power of the gas turbine unit from the high pressure turbine;

(g) maintaining the temperature of the gas supplied to the high pressure turbine by controlling the heat supply to the gas generated in the combustion chamber independently of the useful power recovered from the gas turbine unit; and

(h) controlling the flow of gas between said high and low pressure turbines by adjustment of said flow control vanes to limit the rotational speed of the high pressure turbine to stall the rotor of the low pressure turbine.

4,893,467

CONTROL SYSTEM FOR USE WITH STEAM INJECTED GAS TURBINE

Carl W. Woodson, Ballston Lake, N.Y., assignor to Gas Research Institute, Chicago, Ill.

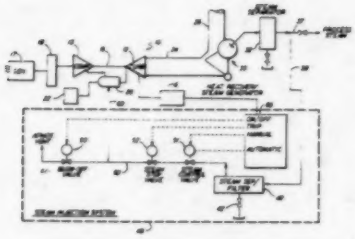
Filed Jul. 13, 1988, Ser. No. 218,680
Int. Cl.[4] F02C *3/30*
U.S. Cl. 60—39.3 **15 Claims**

1. In a gas turbine engine wherein a gas turbine is coupled to a compressor and the compressor provides air to the turbine

combustor, a steam injection system for delivering steam under pressure from a steam supply to the combustor that includes

an injection line for carrying steam from the steam supply to the combustor,

flow regulating means at the entrance to said injection line which opens at the beginning of a steam injection cycle to allow steam to flow to the combustor and closes at the end of said cycle to prevent additional steam from flowing to said combustor,



normally closed venting means connected into the injection line downstream from the flow regulating means which when opened vents the injection line to an area of lower pressure, and

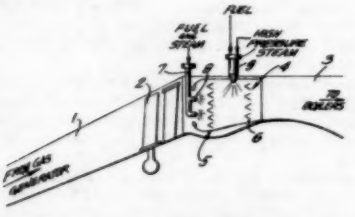
control means connected to said flow regulating means and said venting means for opening and closing the flow regulating means at the beginning and the end of a steam injection cycle and opening the venting means for predetermined period of time at both the beginning and the end of said steam injection cycle to purge said injection line.

4,893,468

EMISSIONS CONTROL FOR GAS TURBINE ENGINE

William R. Hines, Cincinnati, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Filed Nov. 30, 1987, Ser. No. 126,092
Int. Cl.[4] F02C 3/30
U.S. Cl. 60—39.05 **31 Claims**



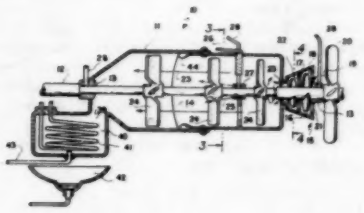
1. A method of controlling combustion emissions of a gas turbine engine including a main combustor operating at a first temperature to provide a gas stream, comprising the steps of locally burning portions of the gas stream at a temperature less than the first temperature in an emissions combustor to provide very hot locally heated portions of the gas stream, and thoroughly mixing the locally heated portions of the gas stream with those portions of the gas stream which are not locally burned and which are cooler portions of the gas stream, while propagating a resulting hot flame front over the gas stream flow to thereby reduce the carbon monoxide emissions.

4,893,469

STEAM AND COMBUSTION GAS ENGINE

Yasui Yamashita, 631 Park Ave., Hot Springs, Ark. 71901

Filed Jan. 7, 1988, Ser. No. 141,576
Int. Cl.[4] F01K 21/04
U.S. Cl. 60—39.54 **7 Claims**



1. An internal combustion engine using a powdered biomass fuel to heat water into steam, including:

an expansion chamber containing a drive shaft, turbine blades affixed to said drive shaft;

a compression chamber disposed at a front end of said expansion chamber and having an air inlet, said compression chamber and said expansion chamber communicating through an aperture disposed between said expansion and compression chambers;

a combustion chamber laterally offset from said expansion chamber and communicating with said expansion chamber through one or more openings disposed between said expansion and combustion chambers;

supply and feed means delivering said powdered fuel into sid combustion chamber;

means to ignite said powdered biomass fuel within said combustion chamber;

means to spray water into said expansion chamber;

an exhaust chamber communicating with said expansion chamber and disposed at an end of said expansion chamber opposite said compression chamber; whereby

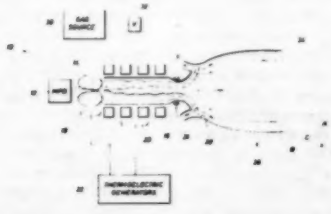
ignition of said powdered biomass fuel heats said water in said expansion chamber, converting said water into steam, which expands and turns said turbine blades and drive shaft, providing power.

4,893,470

METHOD OF HYBRID PLUME PLASMA PROPULSION

Franklin R. Chang, Webster, Tex., assignor to The United States of America as represented by the Administrator, National Aeronautics and Space Administration, Washington, D.C.

Division of Ser. No. 46,341, Apr. 13, 1987, Pat. No. 4,815,279, which is a continuation of Ser. No. 781,397, Sep. 27, 1985, abandoned. This application Sep. 23, 1988, Ser. No. 248,228
Int. Cl.[4] F03H 1/00
U.S. Cl. 60—204 **9 Claims**



1. A method of adjusting the thrust of a propulsive vehicle in

relation to the vehicle velocity to attain an optimal propulsive efficiency, comprising:

producing a hybrid plume having an axis, said hybrid plume being produced by generating a plasma,

enhancing the energy of the plasma,

radially containing and axially guiding the plasma by allowing the plasma to flow in only one axial direction,

producing a relatively lower energy neutral fluid flow,

introducing the relatively lower energy neutral fluid flow to the plasma so as to annularly surround the plasma and flow in the same axial direction, said hybrid plume also having a thrust, said thrust being characterized by a mean particle exit velocity,

selectively varying the thrust of the hybrid plume and its mean particle exit velocity by controlling the mass rate of flow of the neutral fluid, thus selectively adjusting the mass flow rate of the hybrid plume, so that the magnitude of the mean particle exit velocity is near the magnitude of the vehicle velocity.

4,893,471

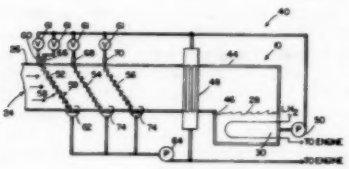
INLET AIR DEMOISTURIZING SYSTEM FOR A CRYOGENIC ENGINE AND METHOD FOR OPERATION THEREOF

Don W. Huling, King County, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Apr. 4, 1988, Ser. No. 176,848

Int. Cl.[4] F02K 9/42

U.S. Cl. 60—204 **16 Claims**



11. A method for removing water from inlet air of a cryogenic engine of the type having an inlet for receiving gaseous air, an outlet for removing liquefied air, and a cross-flow heat exchanger therebetween for transferring heat energy from the gaseous air to a cryogenic fluid in the heat exchanger, comprising:

cooling the gaseous air below the freezing point of water prior to introduction of the gaseous air to the heat exchanger to precipitate water therefrom in the form of ice crystals;

trapping the ice crystals on a screen located between the inlet and the heat exchanger;

washing the screen with liquid air to remove the trapped ice crystals therefrom; and

collecting the liquid air and suspended ice crystals from the screen.

4,893,472

COLLAPSIBLE TUBULAR DIAPHRAGM FOR MASTER CYLINDER RESERVOIR

David C. Barker, Utica, and Keith V. Leigh-Monstevens, Troy, both of Mich., assignors to Automotive Products plc, Warwickshire, England

Filed Feb. 26, 1988, Ser. No. 161,010

Int. Cl.[4] B60T 11/26

U.S. Cl. 60—562 **12 Claims**

10. A hydraulic apparatus comprising:

(A) a cylinder defining a pressure chamber and a reservoir port in communication with said pressure chamber;

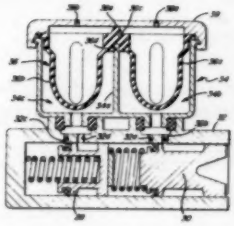
(B) a piston mounted for reciprocal movement in said pressure chamber;

(C) a reservoir mounted on said cylinder and including a closed end adjacent said reservoir port and an open end remote from said reservoir port; and

(D) a diaphragm of tubular configuration having an open end and a closed end;

(E) said diaphragm including an annular mounting portion adjacent its open end for mounting on the open end of said reservoir and a main body portion positioned within said reservoir and extending from said mounting portion to said closed end thereof so as to divide said reservoir into a liquid chamber outside of said diaphragm and in communication with said reservoir port and a gas chamber within said diaphragm;

(F) said reservoir including means venting the open end of said diaphragm to atmosphere so that said gas chamber is at atmospheric pressure;



(G) said main body portion including an annular lip portion for seating on the open end of said reservoir and a conical portion interposed between said lip portion and said main body portion and converging toward said closed end of said diaphragm;

(H) said main body portion maintaining a static system of balance between said liquid chamber and said gas chamber but including a series of axially extending circumferentially spaced flutes extending along said main body portion and a series of axially extending circumferentially spaced rounded ridges extending along said main body portion between said flutes and coacting with said flutes to form a series of radially extending arms arranged about the central axis of the diaphragm, said arms opening in said conical portion proximate the open end of said diaphragm and allowing said main body portion to move in response to wear and liquid leakage in the apparatus between expanded and collapsed conditions.

4,893,473

RESERVOIR-FORMED SHOULDER STOP FOR MAKEUP FLUID VALVE ACTUATION IN PULL-TYPE MASTER CYLINDER

Patrick H. Hool, St. Clair, and Glenn R. Gualdoni, Birmingham, both of Mich., assignors to Lucas Industries Public Limited Company, Birmingham, England

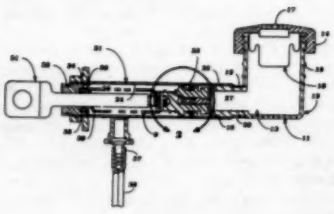
Filed Jan. 21, 1988, Ser. No. 146,347

Int. Cl.[4] B60T 11/22, 11/28; F15B 7/08

U.S. Cl. 60—589 **11 Claims**

7. A fabricated master cylinder comprising a reservoir housing comprised of a first portion defining a cavity adapted to contain a fluid for makeup and a second projecting portion having an end surface, a second part having a generally cylindrical bore received upon and fixed to said projecting portion with said end surface extending into said cylinder bore and forming a shoulder therein, a piston slidably supported in said cylinder bore and dividing said bore into first and second chambers, means accessible externally of said cylinder bore for moving said piston to pressurize said first bore chamber, recuperation passage means extending through said piston between

said first and second second bore chambers, recuperation valve means supported within said piston for controlling the flow through said recuperation passage means, and means forming a



stop defined at least in part by said shoulder for holding said recuperation valve means in an opened position when said piston is at an at rest condition.

4,893,474

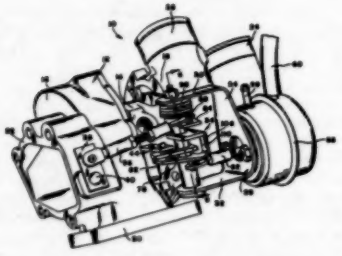
TURBOCHARGER WITH DUAL FUNCTION ACTUATOR

Charles D. Miller, Long Beach; Marian Janik, San Pedro, and Richard S. Tomoyasu, Torrance, all of Calif., assignors to Allied-Signal Inc., Morristown, N.J.

Filed Jul. 25, 1988, Ser. No. 223,302

Int. Cl.[4] F02B *37/12*

U.S. Cl. 60—602 **18 Claims**



1. An exhaust gas driven turbocharger comprising a housing, a shaft rotatably mounted in said housing, a turbine wheel and a compressor wheel mounted in said housing on said shaft for rotation therewith, said housing defining a turbine inlet passage and a compressor inlet passage for communicating exhaust gas to said turbine wheel and ambient air to said compressor wheel respectively and further defining a turbine outlet passage and a compressor outlet passage for communicating exhaust gas and compressed air respectively from said housing a wastegate valve for venting said turbine inlet passage, a flow are control means for varying the flow area of said turbine inlet passage and actuable from a minimum flow area position to a maximum flow area position, a single pneumatic actuator responsive to the pressure level in said compressor outlet passage for sequentially operating both said flow area control means and said wastegate valve, said pneumatic actuator including an output member progressively actuated from a retracted to an extended position in response to successively increasing pressure levels in said compressor outlet passage, and linkage means connecting said output member to both said flow area control means and said wastegate valve, said linkage means including a bellcrank lever pivotally mounted on said housing for rotation about and axis and connected to said output member for rotation thereby as said output member is moved from said retracted to said extended positions, first lever means for operating said flow control means and second lever means for operating said wastegate valve, and control means interconnecting the bellcrank lever with each of said first and second lever means.

4,893,475

COMBUSTION APPARATUS FOR A GAS TURBINE

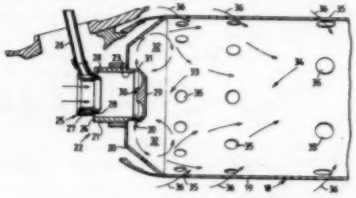
Jeffrey D. Willis, Coventry, England, assignor to Rolls-Royce plc, London, England

Continuation of Ser. No. 108,912, Oct. 15, 1987, abandoned. This application Jul. 17, 1989, Ser. No. 380,749

Claims priority, application United Kingdom, Dec. 10, 1986, 8629468

Int. Cl.[4] F23R *3/20*

U.S. Cl. 60—732 **9 Claims**



1. Combustion apparatus suitable for a gas turbine engine comprising a combustion chamber having a fuel burner at its upstream end, said fuel burner comprising a generally tubular member having an upstream end and a downstream end, said upstream end being positioned externally of said combustion chamber and said downstream end being positioned within said combustion chamber, fuel conduit means having a fuel outlet opening defined within said tubular member and in facing relation to the radially inner walls of said tubular member for directing fuel against said radially inner walls, compressed air inlet means for directing compressed air into said tubular member, said tubular member directing a mixture of said compressed air and fuel into said combustion chamber, the downstream end of said tubular member being provided with a deflection member which is so configured as to cooperate with said tubular member to define a generally annular radially directed outlet with respect to the axis of said tubular member for said mixture of fuel and air, said radially directed outlet being located immediately downstream of the upstream end of said combustion chamber so that said mixture of fuel and air is urged into a single substantially toroidal fuel rich vortex in a first combustion zone situated in the upstream region of said combustion chamber, said combustion chamber being provided with additional air inlets downstream of said burner to direct air into a second combustion zone in said combustion chamber downstream of said toroidal vortex so as to render said second combustion zone fuel weak.

4,893,476

THREE FUNCTION HEAT PUMP SYSTEM WITH ONE WAY RECEIVER

Willem Bos, Sacramento, and Martin Fasciullo, Rancho Cordova, both of Calif., assignors to Phenix Heat Pump Systems, Inc., Sacramento, Calif.

Filed Aug. 12, 1988, Ser. No. 231,454

Int. Cl.[4] F25B *7/00*

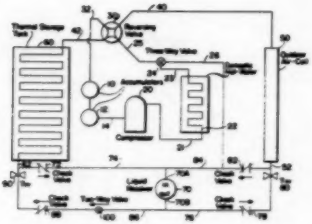
U.S. Cl. 62—79 **14 Claims**

10. A method of providing space heating, space cooling and domestic hot water in a reversible heat pump system with a one-way receiving having an inlet and an outlet, said system comprising the steps of:

directing compressed refrigerant serially through a domestic

hot water heat exchanger to heat water in a domestic water tank;

selecting one of a space heating and space cooling mode; said space heating mode directing refrigerant serially from said domestic hot water heat exchanger through a thermal storage heat exchanger in a thermal storage tank to condense said refrigerant, said receiver inlet, said receiver outlet, and an external heat exchanger; said space cooling mode directing refrigerant serially from said domestic hot



water heat exchanger through said external heat exchanger to condense said refrigerant, said receiver inlet, said receiver outlet, and said thermal storage heat exchanger; and

preventing introduction of refrigerant into said receiver outlet from said thermal storage heat exchanger in said heating mode and from said external heat exchanger in said cooling mode. said receiver outlet, and said thermal storage heat exchanger; and

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4,893,477

FROZEN FOODSTUFFS THAWING DETECTOR DEVICE

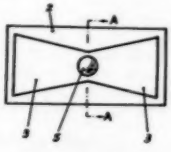
Jose A. G. Vazquez, Pedroneras, 40, 28043 Madrid, Spain

Filed Dec. 7, 1987, Ser. No. 129,284

Claims priority, application Spain, Dec. 10, 1986, 8603349

Int. Cl.[4] F25B *49/00*

U.S. Cl. 62—125 **9 Claims**



2. A thawing detector device comprising:

a container for holding a liquid and having sides defining an interior cavity shaped as two frusto-pyramidal formations oriented in opposed directions and joined at their smaller bases in line with a central transverse plane; and

detection or marker means maintained on the central transverse plane by the freezing of the liquid contained in said container.

4,893,478

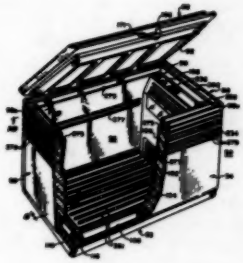
MODULAR REFRIGERATION APPLIANCE WHICH CAN BE ASSEMBLED AT A REMOTE LOCATION

Richard W. Kruck, Sodus Township, Berrien County; Ronald F. Iannelli, St. Joseph Township, Berrien County, and Kevin S. Lausdroche, Detroit, all of Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed Jul. 12, 1988, Ser. No. 217,963

Int. Cl.[4] F25B *49/00*

U.S. Cl. 62—126 **15 Claims**



1. A refrigeration appliance comprising

a plurality of side panels and a base panel each panel comprising a pair of spaced apart walls of plastic material which are sealed at the edges thereof to form a hollow panel, at least some of said side panels and said base panel each having a layer of insulation positioned between said spaced apart walls of the hollow panel, one of said side panels having a complete mechanical refrigeration unit positioned within the hollow panel formed by said spaced apart plastic walls thereof, each of said side panels and said base panel having cooperating means formed in the plastic walls of said hollow panel for interconnecting said side panels with said base panel and with each other, whereby said side panels may be readily assembled on said base panels without the use of tools by simple engagement of said interconnecting means to provide a refrigerated compartment.

4,893,479

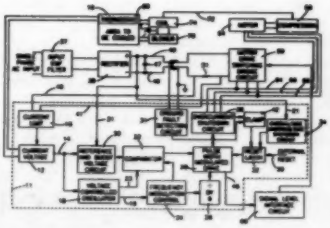
COMPRESSOR DRIVE SYSTEM

Jimmie D. Gillett, Garland; Richard R. Garcia, Plano, and Charles B. Ingram, Coppell, all of Tex., assignors to Ranco Electronics Division, Irving, Tex.

Continuation of Ser. No. 28,309, Mar. 20, 1987, abandoned. This application Jul. 20, 1988, Ser. No. 222,325

Int. Cl.[4] H02P *5/28*

U.S. Cl. 62—213 **16 Claims**



1. A compressor drive system comprising:

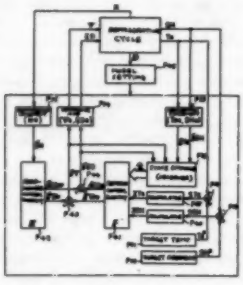
rectifier means for converting externally supplied single phase alternating current into direct current as an output;
temperature sensing means for producing a signal indicating ambient air temperature;
modulation control means for receiving the temperature signal and producing multiphase power and speed control signals;
motor drive switching bridge circuit means for modulating the rectifier output in accordance with the multiphase power and control output signals and producing multiphase power output at a voltage level and at a frequency in response thereto; and
a motor connected to receive the multiphase power output from the bridge circuit means and connected to drive an air conditioner compressor at a speed in accordance with the temperature signal.

4,893,480

REFRIGERATION CYCLE CONTROL APPARATUS

Katsumasa Matsui; Masahiro Ohba, both of Okazaki; Toru Kakehi, Nagoya, and Kazutoshi Nishizawa, Toyoake, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Mar. 11, 1988, Ser. No. 167,103
Claims priority, application Japan, Mar. 13, 1987, 62-59192; May 12, 1987, 62-115268; May 12, 1987, 62-115269
Int. Cl.[4] F25B *41/04*
U.S. Cl. 62—225 **22 Claims**



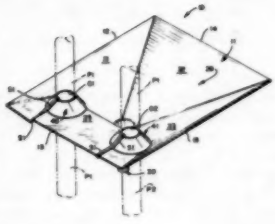
1. A control apparatus for a refrigeration arrangement including a heat exchanger and a compressor, the heat exchanger being disposed within an air duct having a downstream end opening into an interior of a vehicle, the compressor having a variable capacity, the control apparatus comprising:
(a) means for detecting a physical quantity related to a condition of heat exchange of the heat exchanger;
(b) means for setting a target value of the physical quantity;
(c) means for calculating a difference between the detected physical quantity and the target value;
(d) means for calculating a perturbation component of the detected physical quantity which is measured from a steady value of the physical quantity being predetermined relative to a dynamic model;
(e) means for calculating a perturbation component of the compressor capacity on the basis of the difference, the physical quantity perturbation component, and a feedback gain, formed as an optimal regulator based on dynamic models which represent a relationship among the compressor capacity and the physical quantity in terms of perturbation components measured from respective steady values occurring when the refrigeration cycle operates under the steady states;
(f) means for adding the compressor capacity perturbation component and a compressor capacity steady value being predetermined relative to the dynamic model;
(g) means for adjusting the compressor capacity to the output of the adding means; and
(h) means for changing the physical quantity steady value, the feedback gain and the compressor capacity steady value in accordance with a change in an operation condition of the refrigeration cycle, the physical quantity steady value, the feedback gain and the compressor capacity steady value being changeable among values predetermined for respective steady states.

4,893,481

CONVECTOR TRAY

John T. Sullivan, 3910 Madison St., Hyattsville, Md. 20781

Filed Oct. 17, 1988, Ser. No. 258,920
Int. Cl.[4] F25D *21/14*
U.S. Cl. 62—291 **29 Claims**



20. A convector tray comprising a one-piece generally homogeneous in situ molded polymeric/copolymeric material tray body defining an upwardly opening condensate chamber, said condensate chamber being defined by an upper surface and a lower surface, a spout projecting beyond said lower surface, a wall closing said spout at an end remote from said lower surface whereby upon the removal of said wall condensate deposited in said condensate chamber will be discharged therefrom through said spout, and means projecting above said upper surface and defining a removable access area through which a pipe conducting a heat exchange medium is adapted to pass.

4,893,482

WARP-KNITTING FABRIC WITH OBLIQUE AND DIAGONAL FILLING THREADS

Bertram Frenzel; Dietmar Grenzendorfer; Heinz Kemter; Wolfgang Wuensch, and Peter Zeisberg, all of Karl-Marx-Stadt, Fed. Rep. of Germany, assignors to VEB Kombinat Textima, Karl-Marx-Stadt, German Democratic Rep.

Division of Ser. No. 61,254, Jun. 10, 1987, Pat. No. 4,841,747, which is a continuation-in-part of Ser. No. 14,152, Feb. 12, 1987, which is a continuation of Ser. No. 559,116, Dec. 7, 1983, abandoned. This application Mar. 14, 1989, Ser. No. 323,467
Claims priority, application German Democratic Rep., Feb. 28, 1983, 2483026
Int. Cl.[4] D04B *7/12*
U.S. Cl. 66—190 **9 Claims**

1. A warp-knit fabric, and especially a sewn-knitted fabric, comprising a plurality of filling-thread sections disposed in zigzag fashion with respect to each other, each filling-thread section being composed of a plurality of endless filling threads arranged parallel to each other within a filling-thread section, the endless filling threads of a filling-thread section being arranged obliquely and diagonally with respect to a boundary of said fabric, each filling-thread section being arranged obliquely and diagonally with respect to the boundary of said

fabric at a different angle of slope than another filling-thread section, whereby adjacent filling-thread sections overlap one

another, said filling-thread sections being secured to each other by stitch-forming warp threads.

4,893,483

HEAT TREATMENT APPARATUS FOR BOBBINS OF YARN

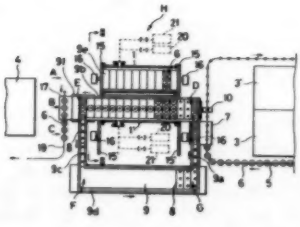
Takuya Kawasaki, Takarazuka, and Osamu Kawakami, Amagasaki, both of Japan, assignors to Nikku Industry Co., Ltd., Itami, Japan

Filed Aug. 25, 1988, Ser. No. 236,224

Claims priority, application Japan, Sep. 18, 1987, 62-232391; Sep. 26, 1987, 62-239975

Int. Cl.[4] D06B *3/04*

U.S. Cl. 68—5 C **13 Claims**



1. A heat treatment apparatus for bobbins of yarn, comprising

first and second heat treatment baths arranged parallel to each other and disposed between a spinning machine and a winding machine;

a conveyor line for supplying bobbins of yarn to be heat-treated from the spinning machine to said heat treatment baths, and another conveyor line for delivering heat-treated bobbins of yarn from said heat treatment bath, to the winding machine;

said heat treatment baths being movable in directions crossing the axial line of the spinning machine; and means provided for automatically alternating heat treatment of bobbins of yarn and replacement of bobbins in a manner such that while bobbins of yarn are heat-treated in either of said first and second heat treatment baths, replacement of heat-treated bobbins with bobbins to be heat-treated takes place in the other of said first and second heat treatment baths.

4,893,484

WASHING MACHINE

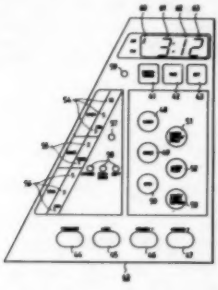
Toshihiro Takahashi; Hideyuki Tobita; Koichi Ito, and Shigeharu Nakano, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 6, 1988, Ser. No. 254,230

Claims priority, application Japan, Oct. 12, 1987, 62-254538

Int. Cl.[4] D06F *33/02*

U.S. Cl. 68—12 R **6 Claims**



1. A washing machine comprising an instruction and control unit having a reservation function means for enabling performance of an at least one reserved washing operation in an order set in advance and at a time set in advance, a drive unit for energizing a load unit for an agitating means, a water supply valve, and a water discharge valve in accordance with an instruction from said instruction and control unit, and an automatic turning off power switch for connecting an alternating current power supply to said load unit and said drive unit, characterized in that

a contact of a relay is interposed between said load unit and said drive unit and said automatic turning off power switch, whereby said contact of said relay is kept open during a waiting period until said at least one reserved washing operation is to be started and said contact of said relay is closed in accordance with an instruction from said instruction and control unit at a start time of said at least one reserved washing operation, said contact of said relay automatically opening after said at least one reserved washing operation has been set in advance.

4,893,485

APPARATUS FOR THE CONTINUOUS APPLICATION OF TREATING LIQUOR ON AN ABSORPTIVE, COMPRESSIBLE MATERIAL WEB

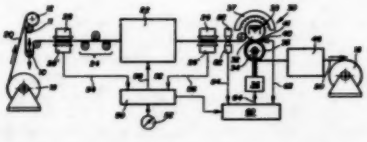
Martin Schwemmer, Urdorf, and Albert Goetz, Limmat, both of Switzerland, assignors to Triatex International AG, Switzerland

Division of Ser. No. 181,831, Apr. 15, 1988, Pat. No. 4,845,791. This application Feb. 7, 1989, Ser. No. 307,407

Claims priority, application European Pat. Off., Apr. 16, 1987, 87810240.9

Int. Cl.[4] D06B *23/00, 15/02*

U.S. Cl. 68—13 R **12 Claims**



1. An apparatus for the continuous and controlled treatment

of an absorptive and compressible material web, said apparatus comprising:

means for advancing the web along a path;

an applicator device for applying liquor to the web while the web is advancing along said path;

two solid surfaces on said path and downstream from said applicator device, said solid surfaces forming a nip for equalizing the distribution of liquor applied to the web by redistributing liquor from regions of the web which contain relatively high amounts of liquor to regions of the web which contain relatively low amounts of liquor, without squeezing liquor out of the web; and

thickness adjusting means for adjusting and controlling the thickness of said nip by moving one of said solid surfaces with respect to the other.

4,893,486

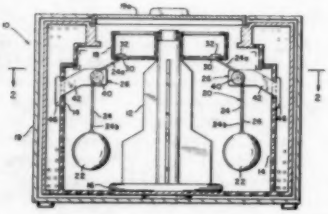
FLOW-INTENSIFYING APPARATUS FOR CLOTHES WASHER

Guillermo Diaz, Dover, N.J., assignor to Agriworld Corp., Union, N.J.

Filed Jul. 19, 1989, Ser. No. 382,714

Int. Cl.[4] D06F 17/10

U.S. Cl. 68—18 FA **26 Claims**



1. Flow-intensifying apparatus for use in an upright automatic clothes washing machine having a central vertically oriented agitator, a hollow cylindrical drum coaxially disposed about the agitator, and means for reciprocally rotating the agitator and the drum relative to each other about a vertical axis during the washing cycle, said flow-intensifying apparatus comprising:

(A) weighted means adapted to be disposed intermediate the agitator and the drum;

(B) non-extendible elongate means adapted to be operatively connected at one end to the agitator for movement therewith and at the other end to said weighted means for movement therewith;

(C) redirecting means adapted to be traversed by said elongate means and operatively connected to the drum for movement therewith so that the reciprocal relative rotation of the agitator and the drum causes a corresponding reciprocal vertical movement of said weighted means.

4,893,487

LOCKING DEVICE FOR BOAT MOTOR

Todd W. Johnson, 3 Newtonville Ave., Newton, Mass. 02158

Filed Jun. 14, 1989, Ser. No. 366,674

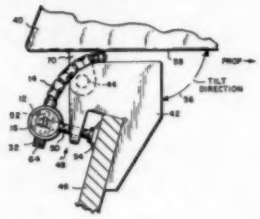
Int. Cl.[4] E05B 73/00

U.S. Cl. 70—58 **17 Claims**

1. A locking device for a motor mounted to a boat by at least one turnbolt, each turnbolt having a head and a shank, the motor having a prop and being moveable between an operative position with said prop in water and an inoperative position with the prop out of water, the locking device comprising:

a hollow tubular member which is sealed at one end and is normally open at the other end, a slot extended from the open end being formed in a side of said member, the length of said slot being greater than the spacing between the two most widely separated of said turnbolt shanks, the hollow portion of said member being large enough to permit the turnbolt heads to be fitted therein when said slot is fitted, open end first, over said shanks;

locking means for sealing the open end of said member when said member is positioned on said turnbolts; and



inhibit means cooperatively associated with said member and said locking means when said member is mounted on said turnbolts and sealed by the locking means for engaging the motor to prevent the motor from being moved from its inoperative to its operative positions.

4,893,488

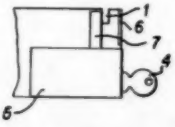
MODULAR COMMUNICATIONS SOCKET LOCK

Edward Klein, 2 Professional Dr., Ste. 232, Gaithersburg, Md. 20879

Filed Mar. 2, 1989, Ser. No. 318,013

Int. Cl.[4] E05B 73/00

U.S. Cl. 70—360 **7 Claims**



1. A device for locking and unlocking an unused modular communications socket, said device comprising a locking mechanism entirely inclosed in casing while in the unlocked position, said casing dimensioned to fit said communications socket and having opening in said casing positioned to allow sliding bolt mechanism to protrude from said opening in casing posterior to retention shoulder of said communications socket, preventing removal of said device in locked position, and allowing for unlocking of said device by repositioning bolt inside of casing allowing for the removal of said device from modular socket.

4,893,489

DRIVE SYSTEM FOR A BENDING MACHINE

Benjamin Mason, Newark, England, assignor to Caledonian Mining Company Limited, Great Britain

Continuation-in-part of Ser. No. 30,872, Mar. 26, 1987, abandoned. This application Mar. 14, 1988, Ser. No. 170,138

Claims priority, application United Kingdom, Mar. 27, 1986, 8607806

Int. Cl.[4] B21D 5/14

U.S. Cl. 72—8 **21 Claims**

1. A bending machine for bending a strip workpiece from a linear infeed configuration to a curved outfeed configuration, said machine comprising

at least three rollers oriented in a generally triangular pattern through which said strip workpiece is passed,

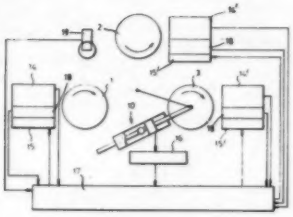
means for ascertaining the position of one of said rollers,

bi-directional means for adjusting that position, said bi-directional means permitting the roller position to be altered in two directions which are perpendicular one relative to the other,

means for measuring the speed of rotation of one of said rollers,

means for adjusting that speed,

means for measuring the torque applied to one of said rollers, and



a control system unit to which signals are fed from said position ascertaining means and from said speed measuring means, said control system unit being connected to said bi-directional means and to said speed adjusting means for adjusting the position and speed for the affected roller, a signal from said means for measuring the applied torque on the affected roller also being fed to said control system unit, said control system unit being connected to said means for adjusting the applied torque of that affected roller all so that commands may be given to vary these parameters in order to enhance the desired bending of a linear infeed workpiece into a curved outfeed workpiece.

4,893,490

DEVICE AND PROCESS FOR CONTROLLING THE EFFECTIVENESS OF PARTICLE HAMMERING OF THE INNER SURFACE OF A STEAM GENERATOR TUBE

Gerald Isnardon, Nanterre; Paul Jacquier, Tassin la Demi-Lune, and Lylvie Voisembert, Heyrieux, all of France, assignors to Framatome, Courbevoie, France

Filed Mar. 14, 1988, Ser. No. 168,059

Claims priority, application France, Mar. 13, 1987, 8703484

Int. Cl.[4] B23P *15/26*

U.S. Cl. 72—53 **8 Claims**

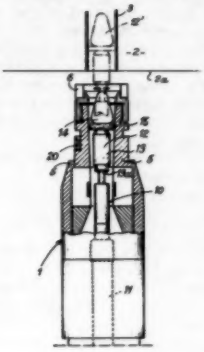
7. Process for controlling the effectiveness of particle hammering of the inner surface of a steam generator tube (3) set into a tube plate (2), the hammering being performed by means of a device comprising a tubular outer housing (5) having an end face (6) bearing on a face (2*a*) of the tube plate (2), around a flush end of the tube (3), and a tool comprising a nozzle (12) for projecting particles conveyed by a gas at high speed and fastened at the end of a flexible conduit which supplies said particles, said nozzle and conduit being (11) mounted for axial movement in the outer housing (5), said process comprising the steps of

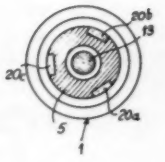
(a) moving the nozzle (12) for projecting the particles into a position inside the outer housing (5), after having performed the hammering in a tube (3);

(b) projecting at high speed a jet of particles suspended in the gas which is identical to the jet of particles which has performed the hammering of the tube (3) onto the inner surface of the outer housing (5);

(c) converting the ultrasonic waves due to the impact of the particles against the outer housing (5) into electrical signals;

(d) measuring the amplitude of the electrical signals produced by the impact of the particles; and





(e) using the measurement of the amplitude of the electrical signals to control the effectiveness of the hammering in the tube (3).

4,893,491

APPARATUS FOR FORMING COIL SPRINGS

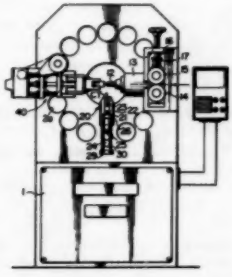
Yozo Ohdai, Kasugai; Norifumi Abiru, Owariasahi, and Eiji Ohbayashi, Kuwana, all of Japan, assignors to Asahi-Seiki Manufacturing Co., Ltd., Aichi, Japan

Filed Mar. 16, 1988, Ser. No. 169,048

Claims priority, application Japan, Mar. 30, 1987, 62-47491[U]

Int. Cl.[4] B21F *3/02, 35/02*

U.S. Cl. 72—137 **10 Claims**



1. An apparatus for forming a coil spring, comprising:

a quill having a longitudinal axis and a tip through which a wire to be formed into said coil spring is fed;

a tool assembly disposed opposite said quill and including a

tool operating support for slidable movement along the axis of said quill, an operating cylinder supported on said tool operating support for rotation about the axis of said quill, a tool holder supported on said operating cylinder for swinging movement about an axis perpendicular to the axis of said quill, a forming tool securely held at one end of said tool holder and having a forming surface, and an operating rod operatively connected to the other end of said tool holder and supported for forward and backward movements with respect to said operating cylinder along the axis of said quill;

first drive means for moving said operating support toward and away from said quill;

second drive means for rotating said operating cylinder about the axis of said quill with respect to said operating support;

third drive means for moving said operating rod to swing said tool holder between a first position at which said forming surface of said forming tool is located outside the axis of said quill and a second position at which said forming surface is located to confront said tip of said quill;

fourth drive means for feeding the wire through said tip of said quill; and

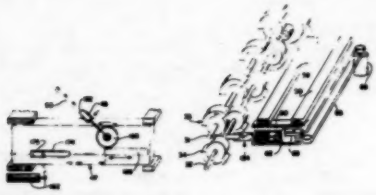
control means for controlling operation of said first, second, third and fourth drive means.

4,893,492

ROLL FORGING MACHINE AND METHOD

Mike B. Martiscle, Mentor, Ohio, assignor to Ajax Manufacturing Co., Cleveland, Ohio

Filed Sep. 30, 1988, Ser. No. 251,517
Int. Cl.[4] B21B *39/24*
U.S. Cl. 72—188 **49 Claims**



1. In combination a roll forging machine comprising top and bottom roll forging dies forming side-by-side roll forging passes, a stock transfer comprising a grip head, means supporting said grip head on an X axis slide for movement aligned with the passes, means supporting said slide on a Y axis carriage for movement of the slide from pass-to-pass, motor means on said carriage driving a timing belt in the X direction, and means on said slide to grip said timing belt to cause said slide to move with said timing belt in the X direction.

4,893,493

MECHANICALLY POWERED CRIMPING TOOL

Serge Jacquet, 5142 Des Veterans, Lac Megantic, Quebec, Canada (G6B 2G5), and Roger Boulanger, 210 Rang des Grenier, Piopolis, Quebec, Canada (G0Y 1H0)

Filed Dec. 15, 1988, Ser. No. 284,571
Int. Cl.[4] B23P *11/00, 28/32*
U.S. Cl. 72—325 **12 Claims**

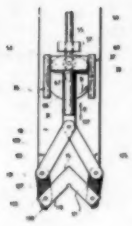
1. A mechanically powered tool comprising:

a crimping device capable of shearing tines out of an angle-bar used for protecting a corner formed by two wall panels and driving said tines into said panels for fixing said angle-bar thereto, said crimping device including a rectilinearly reciprocable actuating rod connected thereto and movable in a working stroke;

a movement-transforming device having an output section including a follower block displaceable in a rectilinearly reciprocable motion, said block being formed with an elongated open slot extending in a direction normal to said motion and being operatively connected to one end of said rectilinearly reciprocable actuating rod to displace said rod and said crimping device in said working stroke, said movement-transforming device further having a rotary input section;

a single-revolution clutch having a rotary shaft operatively connected to said rotary input section of said movement-transforming device, said clutch further having a rotary input section;

power means including a rotary member operatively connected to said rotary input section of said single-revolution clutch;



said output section of said movement-transforming device further comprises constraining means for constraining said follower block into said rectilinear reciprocable motion of said actuating rod; and

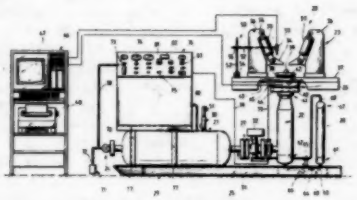
said rotary input section of said movement-transforming device comprises a disk fixed at the center thereof for rotation on an end of said rotary shaft of said clutch, and a roller mounted at the periphery of said disk, said roller being engaged in said open slot of said follower block, constructed so that, upon rotation of said disk, said roller moves back and forth in said slot and causes said follower block, said actuating rod and said crimping device to be displaced according to said stroke.

4,893,494

METHOD AND SYSTEM FOR TESTING SAFETY RELIEF VALVES

Waring F. Hart, Pearland, Tex., assignor to Management Services International, Inc., Houston, Tex.

Filed Mar. 31, 1988, Ser. No. 176,309
Int. Cl.[4] G01M *19/00*; G01L *27/00*
U.S. Cl. 73—4 R **12 Claims**



1. A method for testing a safety relief valve comprising the steps of:

(a) disposing a first pressure vessel in fluid communication with a reservoir of high pressure fluid;

(b) disposing between the first pressure vessel and the reservoir, a first means for controlling the fluid flow between the first pressure vessel and the reservoir;

(c) maintaining the pressure of the high pressure fluid in the

reservoir at a substantially greater pressure than the pressure in the first pressure vessel;

(d) disposing the safety relief valve in unrestricted fluid communication with a second pressure vessel; the second pressure vessel being disposed between the first pressure vessel and the safety relief valve, the first pressure vessel having a larger volume than the second pressure vessel;

(e) disposing between the first and second pressure vessels, a second means for controlling fluid flow between the first and second pressure vessels;

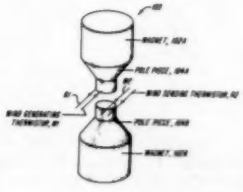
(f) metering high pressure fluid from the reservoir through the first and second pressure vessels and into the safety relief valve, by utilizing the fluid flow control means, to provide the necessary fluid pressure in the second pressure vessel to open the safety relief valve, and to provide a sufficient, variable volume of fluid through the safety relief valve to prevent the safety relief valve from simmering and damaging the safety relief valve upon closing.

4,893,495

OXYGEN SENSING METHOD AND APPARATUS

Emilio Meyer, Assago-Milan, Italy, assignor to Panametrics, Inc., Waltham, Mass.

Filed Oct. 3, 1988, Ser. No. 252,812
Int. Cl.[4] G01N *27/74*
U.S. Cl. 73—27 A **8 Claims**



1. Apparatus for measuring the concentration of a paramagnetic gas in a gas mixture, comprising

magnetic field means for generating an inhomogeneous magnetic field,

magnetic wind generating thermistor means, including first and second electrically heated magnetic wind generating thermistors, said first and second magnetic wind generating thermistors having an electrical parameter proportional to temperature, said first and second magnetic wind generating thermistors being positioned inside said inhomogeneous magnetic field, for generating a magnetic wind in the presence of a paramagnetic gas, the magnetic wind having a magnitude proportional to concentration of the paramagnetic gas in the gas mixture,

magnetic wind sensing thermistor means, including first and second electrically heated magnetic wind sensing thermistors, said first and second magnetic wind sensing thermistors having an electrical parameter proportional to temperature, said first and second magnetic wind sensing thermistors positioned substantially outside said inhomogeneous magnetic field, for sensing the magnetic wind generated by said first and second magnetic wind generating thermistors in the presence of a paramagnetic gas, and

signal generating means, in electrical circuit with said magnetic wind generating thermistor means and said magnetic wind sensing thermistor means, for measuring said electrical parameter of said magnetic wind sensing thermistors and generating a measurement signal having an amplitude representative of the concentration of the paramagnetic gas in the gas mixture and proportional to the magnitude of the magnetic wind in the presence of the paramagnetic gas, said signal generating means including

a Wheatstone bridge having four branches, said four branches including said first and second magnetic wind generating thermistors and said first and second magnetic wind sensing thermistors, and

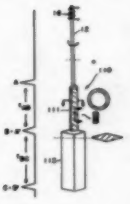
temperature control means for automatically maintaining said first and second magnetic wind generating thermistors and said first and second magnetic wind sensing thermistors at a substantially constant temperature.

4,893,496

TORSIONAL WAVE FLUID SENSOR AND SYSTEM

Haim H. Bau, Swarthmore; Jin O. Kim, Philadelphia, both of Pa.; Lawrence C. Lynnworth, Waltham, and Toan H. Nguyen, Needham, both of Mass., assignors to Panametrics, Inc., Waltham, Mass.

Filed Oct. 14, 1988, Ser. No. 257,714
Int. Cl.[4] G01N *9/24*
U.S. Cl. 73—32 A **46 Claims**



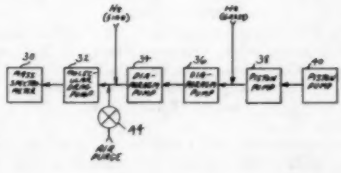
4. A sensor for sensing a physical property of a fluid, such sensor comprising a sensor body having at least a portion adapted for immersion in the fluid such that propagation of a torsional wave in said portion is modified by contact with the fluid, wherein a first part of said portion has a cross-sectional shape optimized to modify the propagation of said wave in functional dependence on a first property of said fluid, and a second part of said portion has a shape selected to modify the propagation of said wave in functional dependence on a second property of said fluid different from said first property.

4,893,497

LEAK DETECTION SYSTEM

Philip Danielson, 5620 Main St., Downers Grove, Ill. 60516

Filed Sep. 12, 1988, Ser. No. 193,810
Int. Cl.[4] G01M *3/20*
U.S. Cl. 73—40.7 **19 Claims**



1. In a leak-detection system for detecting leaks in vacuum vessels and containers, which system comprises helium-detection means for sensing the presence of helium, which helium is a probe gas injected into a vacuum vessel or container being tested for leaks, high-vacuum pump means connected to said helium-detection means for forming a high vacuum in said helium-detection means, means for directing helium probe gas from a leak to the outlet of said high-vacuum pump means, and support pump means connected to the outlet of said high-vacuum pump means for exhausting the system to the environmental surroundings, the improvement comprising:

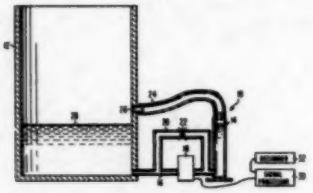
said high-vacuum pump means comprising a molecular drag pump having an inlet in fluid communication with the interior of said helium-detection means, and an outlet in fluid communication with said means for directing.

4,893,498

METHOD AND APPARATUS FOR DETECTING LIQUID LEAKS

Jay E. Jensen, Raritan, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Apr. 19, 1988, Ser. No. 183,121
Int. Cl.[4] G01M *3/32*
U.S. Cl. 73—49.2 **9 Claims**



1. A liquid leak detector for a storage tank, comprising:
(a) a vertically upright standpipe;
(b) means for connecting said standpipe to a storage tank at the bottom of the tank to fill the standpipe with the liquid in the tank to the same level as the liquid in the tank;
(c) a first pipe connected to said standpipe at its bottom and adapted to be connected to the tank at the bottom of the tank;
(d) a pressure transducer in said first pipe for measuring the pressure differential between the liquid in the tank and the liquid in the standpipe, said pressure transducer having an electrical output signal corresponding to the pressure differential; and
(e) a hose connected to the top of the standpipe and adapted to be connected to the tank above the level of the liquid in the tank;
wherein said means for connecting said standpipe to the tank is a second pipe connected to the standpipe and bypassing the transducer, said second pipe having a valve therein.

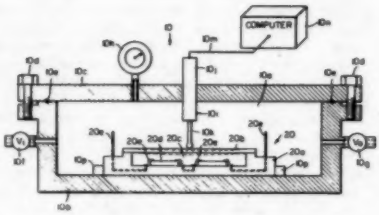
4,893,499

METHOD AND APPARATUS FOR DETECTING LEAKS IN IC PACKAGES BY SENSING PACKAGE DEFLECTIONS

Wilbur T. Layton, San Diego; Dale L. Robinson, Escondido, and Jerry I. Tustaniwskyj, Mission Viejo, all of Calif., assignors to Unisys Corporation, Blue Bell, Pa.

Filed Dec. 5, 1988, Ser. No. 280,089
Int. Cl.[4] G01M *3/36*
U.S. Cl. 73—49.3 **7 Claims**

1. A method of detecting whether or not an enclosure of a package leaks above a certain minimum rate; said enclosure being filled with a first gas at a first pressure; and, said method including the steps of:
enveloping said package in a second gas at a second pressure;
measuring respective deflections, by a surface of said enclosure, at the start and end of a time interval during said enveloping step; and,
rejecting said package for having a leak if the difference between said respective deflections exceeds a certain limit; wherein,
said second gas is of a type which leaks into said enclosure faster than said first gas leaks out, said second pressure is larger than said first pressure, and said time interval is substantially shorter than one during which respective deflections occur that differ by said limit under the conditions where said package has said minimum leak rate and is enveloped by said first gas at said second pressure.

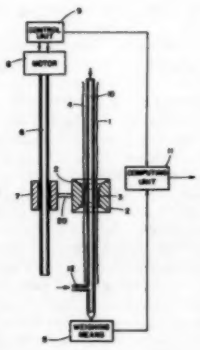


4,893,500

METHOD OF MEASURING THE FLOW PROPERTIES OF HIGH VISCOSITY FLUIDS AS WELL AS A DEVICE FOR CARRYING OUT THE INVENTIVE METHOD

Paul Fink-Jensen, Copenhagen, Denmark, assignor to Reciprotor A/S, Farum, Denmark

Filed Sep. 19, 1988, Ser. No. 246,508
Int. Cl.[4] G01N *11/10*
U.S. Cl. 73—60 **12 Claims**



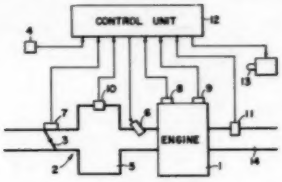
1. A device for measuring the flow properties of preferably high viscosity fluids, said device comprising a rod and a ring movably borne around said rod, a gap being provided between the rod and the ring for receiving the fluid whose viscosity is to be measured, said device further comprising a first measuring unit for measuring the shear force imparted to the fluid by the mutual displacement of the rod and the ring, and a second measuring unit for measuring the relative velocity of the ring and the rod, wherein moving means are provided for imparting a controlled movement to the ring with respect to the the rod.

4,893,501

THROTTLE VALVE OPENING DEGREE DETECTING SYSTEM FOR CONTROLLING AN INTERNAL COMBUSTION ENGINE

Yoshiyuki Sogawa, Tokyo, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 16, 1988, Ser. No. 271,691
Claims priority, application Japan, Nov. 24, 1987, 62-296996
Int. Cl.[4] G01M *15/00*
U.S. Cl. 73—118.1 2 Claims



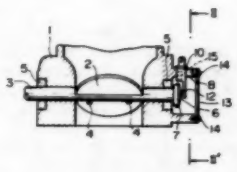
1. A throttle valve opening degree detecting system for controlling an internal combustion engine comprising:
- a throttle sensor for detecting a throttle valve opening degree;
- a plurality of switch means;
- a plurality of resistors each coupled to a corresponding one of said plurality of switch means, said plurality of resistors being adapted to be connected in parallel with said throttle sensor; and
- control means for supplying a control signal to turn on and off said plurality of switch means;
- whereby said plurality of switch means are selectively turned on and off in response to said control signal from said control means to variably set the output voltage characteristic of said throttle sensor;
- said control means changes the on/off state of said control signal in accordance with the engine speed.

4,893,502

ANGLE SENSOR FOR THROTTLE VALVE OF INTERNAL COMBUSTION ENGINE

Masanori Kubota, Nakaminato; Sadayasu Ueno; Kanemasa Sato, both of Katsuta, and Kiyoshi Miura, Ibaraki, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Automotive Engineering Co., Ltd., Katsuta, both of, Japan

Filed Aug. 3, 1988, Ser. No. 227,647
Claims priority, application Japan, Aug. 3, 1987, 62-192649; Mar. 30, 1988, 63-74338
Int. Cl.[4] G01M *15/00*
U.S. Cl. 73—118.1 20 Claims



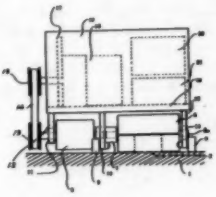
16. An angle sensor for a throttle valve of an internal combustion engine, comprising:
- a permanent magnet for generating a magnetic field, said permanent magnet being disposed at one end of the shaft of the throttle valve so as to move in a plane substantially transverse to the axis of said throttle valve shaft with the rotation of said throttle valve shaft;
- a throttle body accommodating said throttle valve;
- a cavity formed as an integral part of said throttle body to freely rotatably accommodate said permanent magnet and communicating with a bore through which said throttle valve shaft extends;
- a magneto-sensitive element disposed in said cavity with its detecting surface in a plane substantially transverse to the axis of said throttle valve shaft and in a relation substantially facing the maagnetic-flux appearing surface of said permanent magnet and being spaced apart from said magnetic-flux appearing surface of said permanent magnet by a varying gap so as to detect a change in the magnetic flux density as a result of the change in said gap with rotation of said permanent magnet; and
- an electrical circuit receiving and amplifying the output of said magneto-sensitive element so as to convert the detected change in said magnetic flux density into a corresponding change in an electrical signal.

4,893,503

METHOD OF MEASURING ADHESIVE STRENGTH OF ADHESIVE SHEET AND APPARATUS FOR IMPLEMENTING THIS METHOD

Akira Kimura, Suita, and Osamu Tomita, Osaka, both of Japan, assignors to Kanzaki Paper Manufacturing Co., Tokyo, Japan

PCT No. PCT/JP87/00274, § 371 Date May 17, 1988, § 102(e) Date May 17, 1988, PCT Pub. No. WO88/02484, PCT Pub. Date Apr. 7, 1988
PCT Filed Apr. 30, 1987, Ser. No. 208,417
Claims priority, application Japan, Sep. 27, 1986, 61-2288040
Int. Cl.[4] G01N *19/04*
U.S. Cl. 73—150 A 5 Claims



1. A method of measuring an adhesive strength comprising the steps of:
- keeping the peripheral surface of a pickup roller at a level slightly heightened from the surface of a substrate adhered with an adhesive sheet such that the uppermost portion of the peripheral surface of said of pickup roller faces the top surface of said adhesive sheet on the substrate, by contacting an auxiliary roller projecting from a machine frame with the surface of a substrate;
- securing the tip end of either the adhesive sheet or a lead-in tape leading said adhesive sheet to engaging means of said pickup roller;
- setting a specific peeling angle for peeling said adhesive sheet from the surface of said substrate;
- pulling said adhesive sheet by rotating said pickup roller at a constant speed while maintaining the set angle;
- peeling off said adhesive sheet from said substrate, and subsequently winding it onto said pickup roller;
- detecting the torque of said pickup roller by means of a torque detector; and
- displaying and/or recording adhesive-strength of said adhesive sheet to said substrate based on signals output from said torque detector.

5. An adhesive-strength measuring apparatus comprising: a pickup roller which is provided with engaging means for engaging a free end of either an adhesive sheet with which the surface of a substrate is adhered, or a lead said adhesive sheet, said egaging means being substantially groove which makes up

an acute angle against the tangent of the circumference of said pickup roller on the extended side from said adhesive sheet at the engaging point in order that either said adhesive sheet or lead-in tpae can securely be engaged by means of inserting a head chip secured to tip end of said adhesive sheet or lead-in tape into said groove;

a plurality of auxiliary rollers for contacting the surface of the substrate adhered with said adhesive sheet to keep the peripheral surface of said pickup roller at a level slightly heightened from the surface of said substrate such that the undermost portion of the peripheral surface of said pickup roller faces the top surface of said adhesive sheet on the substrate;

drive means for said pickup rotating roller at a constant speed;

torque detection means for generating output signals by detecting the torque of said pickup roller; and

display means for displaying adhesive strength of said adhesive sheet to said substrate based on the output

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4,893,504

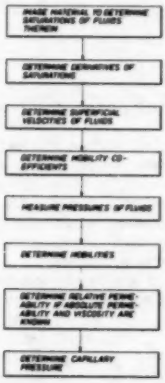
METHOD FOR DETERMINING CAPILLARY PRESSURE AND RELATIVE PERMEABILITY BY IMAGING

Daniel J. O'Meara, Jr., and Harold J. Vinegar, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Division of Ser. No. 881,159, Jul. 2, 1986, abandoned. This application Jul. 22, 1988, Ser. No. 222,878

Int. Cl.[4] E21B 49/02

U.S. Cl. 73—153 **9 Claims**


PHASE MATERIAL TO DETERMINE SATURATIONS OF FLUIDS THEREIN
DETERMINE DERIVATIVES OF SATURATIONS
DETERMINE SUPERFICIAL VELOCITIES OF FLUIDS
DETERMINE MOBILITY COEFFICIENTS
MEASURE PRESSURES OF FLUIDS
DETERMINE MOBILITIES
DETERMINE RELATIVE PERMEABILITY IF ABSOLUTE PERMEABILITY AND VISCOSITY ARE KNOWN
DETERMINE CAPILLARY PRESSURE

1. A method for determining at least one preselected petrophysical property of a material having determinable porosity parameters and determinable absolute permeability parameters and/or of preselected fluids having determinable viscosity parameters contained therein, comprising:

imaging a preselected volume of such material to determine the saturations of such fluids in said preselected volume,

determining time and spatial derivatives of said determined saturations

determining superficial velocities of such fluids, and

determining said at least one petrophysical property.

4,893,505

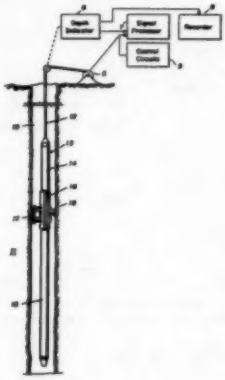
SUBSURFACE FORMATION TESTING APPARATUS

Michael J. Marsden, Houston, and Wade M. Johnson, Jr., Cypress, all of Tex., assignors to Western Atlas International, Inc., Houston, Tex.

Filed Mar. 30, 1988, Ser. No. 146,489

Int. Cl.[4] E21B 47/06

U.S. Cl. 73—155 **29 Claims**



1. Apparatus for obtaining temperature corrected pressure measurement characteristics of a connate fluid sample from subsurface earth formations traversed by a borehole, comprising:

a body member for positioning in a borehole;

a sample probe cooperatively arranged on and extensible from said body member into the earth formations;

pressure sensing means coupled to said sampling probe for measuring the pressure of a connate fluid sample from said earth formations, said pressure sensing means including a first strain gauge pressure transducer pressure sensor for generating a first pressure measurement and a second pressure sensor for generating a second pressure measurement;

temperature sensing means coupled to said sampling probe for simultaneously measuring the temperature of said connate fluid sample from said earth formations; and

means for correcting the first and second pressure measurements as a function of said temperature measurement.

4,893,506

METHOD FOR ESTIMATING RAINFALL AND A SENSING DEVICE THEREFOR

Jin Ming Shyu; Kuang Pu Wen, and Joseph Huang, all of Hsin Chu Hsien, Taiwan, assignors to Industrial Technology Research Institute, Hsin Chu Hsien, Taiwan

Filed Jul. 14, 1988, Ser. No. 218,845

Int. Cl.[4] G01W 1/14

U.S. Cl. 73—171 **8 Claims**

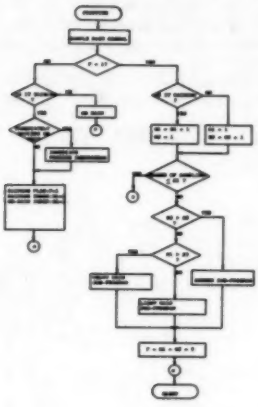
7. An apparatus for estimating rainfall comprising:

means for sensing a presence or absence of a rain drop and generating a rain signal in response thereto, said rain signal having a rain-present state in the presence of said rain drop and a rain-absent state in the absence of a rain drop;

sampling means for sampling said rain signal to generate a sequence of samples of said rain signal; and

calculating means for determining a rain state based on said samples, said samples being compared to a predetermined

minimum value, said sequence of samples comprising a raining signal time and a no-rain signal time, said raining



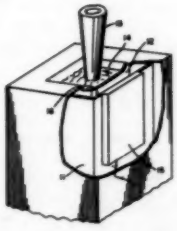
signal time and no-rain signal time being compared with said predetermined value to determine said rain state.

4,893,507

DEVICE TO MEASURE THE LEVEL OF LIQUID METAL IN A CRYSTALLIZER OF A CONTINUOUS CASTING INGOT MOULD

Lorenzo Ciani, Udine, Italy, assignor to CEDA SpA Costruzioni Elettromeccaniche e Dispositivi d'Automazione, Buttrio, Italy

Filed Oct. 12, 1988, Ser. No. 256,468
Claims priority, application Italy, Oct. 21, 1987, 83479 A/87
Int. Cl.[4] G01F *23/26*
U.S. Cl. 73—290 R **16 Claims**



1. A device to measure the level of liquid metal in a crystallizer of a continuous casting ingot mold, said ingot mold having a cooling fluid conveyor surrounding at least a portion of the crystallizer, said device comprising:

a container disposed on the conveyor and spaced apart from the crystallizer; and

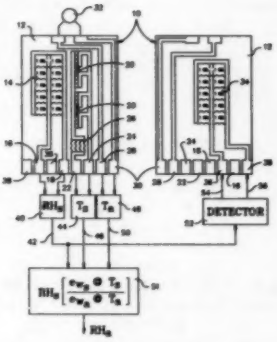
means for determining the level of liquid metal in the crystallizer, comprising an emitter coil, at least one receiver coil, and a first generator for supplying at least one high frequency to the emitter coil so as to create an electromagnetic field, said determining means being contained within aid container so that the generator, emitter coil and receiver coil are located within the body of the ingot mold, said determining means being coupled electromagnetically to a single wall of the crystallizer and to the volume within the crystallizer, without contacting the crystallizer.

4,893,508

HUMIDITY SENSING APPARATUS AND METHOD THEREFOR

Maurice Friedman, Roslyn, Pa., assignor to VIZ Manufacturing Company, Philadelphia, Pa.

Filed Dec. 13, 1988, Ser. No. 283,798
Int. Cl.[4] G01W *1/02, 1/08*
U.S. Cl. 73—336.5 **16 Claims**



1. A humidity sensing system, comprising, in combination:

a support;

first means deposited on said support for continuously producing a first signal indicative of the relative humidity above the dew point temperature of a gas mixture contiguous thereto;

second means deposited on said support for producing a second signal indicative of the temperature of said support;

third means for producing a third signal indicative of the temperature of the gas mixture at a point spaced from said support; and

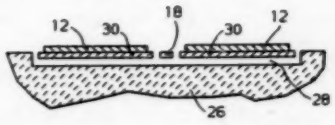
computer means responsive to said signals for determining the relative humidity of the mixture at the spaced point as a function of the first signal and the ratio of saturation vapor pressures of the mixture at the respective temperatures indicated by the second and third signals.

4,893,509

METHOD AND PRODUCT FOR FABRICATING A RESONANT-BRIDGE MICROACCELEROMETER

Bernard A. MacIver, Lathrup Village, and James C. Erskine, Birmingham, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Dec. 27, 1988, Ser. No. 291,250
Int. Cl.[4] H01L *21/306*; B44C *1/22*; C03C *15/00, 25/06*
U.S. Cl. 73—517 AV **14 Claims**



1. A method for forming an accelerometer comprising the following steps:

providing a silicon substrate;

forming a buried layer in said silicon substrate;

forming a predetermined proof mass of appropriate lateral

dimensions on said silicon substrate symmetrically disposed generally over said buried layer;

removing silicon from said silicon substrate, so as to delineate a pattern which generally corresponds to said lateral dimensions of said predetermined proof mass and so as to delineate a plurality of microbridges; and

removing said buried layer in said silicon substrate so as to form a cavity generally everywhere therebetween said proof mass and said microbridges, and said silicon substrate.

4,893,510

METHOD OF MEASURING DISTRIBUTION OF CRYSTAL GRAINS IN METAL SHEET AND APPARATUS THEREFOR

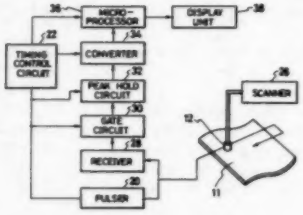
Fumihiko Ichikawa, Yotsukaido; Hajime Takada, and Kazuya Asano, both of Chiba, all of Japan, assignors to Kawasaki Steel Corporation, Hyogo, Japan

Filed Nov. 14, 1988, Ser. No. 270,648

Claims priority, application Japan, Nov. 16, 1987, 62-289019; Sep. 20, 1988, 63-235294

Int. Cl.[4] G01N *29/00*

U.S. Cl. 73—620 **10 Claims**



1. A method of measuring a distribution of crystal grains in metal sheet, comprising:

determining an exciting frequency of ultrasonic wave such that a wavelength of ultrasonic wave propoagated in a direction of the sheet thickness of the grains each having an aimed orientation is set at a value of twice the thickness of the sheet multiplied by about integers or about half integers;

directing into the sheet thickness burst-like ultrasonic pulses having said frequency and including two or more waves by use of at least one ultrasonic probe moving relatively with the metal sheet;

causing multiple reflected waves generated from the bottom and top faces of the metal sheet upon the reflection from the sheet surface to interfere with each other;

detecting said multiple reflected waves, which have interfered with each other;

estimating orientations of the grains in the metal sheet from the magnitudes in amplitude of said interferent multiple reflected waves; and

two-dimensionally detecting the distribution of the grains in orientation in various portions, into which the ultrasonic wave is directed.

4,893,511

METHOD AND APPARATUS FOR DETERMINING CRACKS IN A SHAFT BY MEANS OF AN ULTRASOUND PULSE ECHO

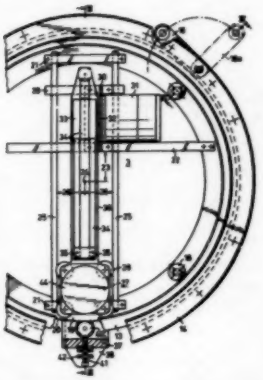
Wilhelm Voigt, and Ingo Hildmann, both of Berlin, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Aug. 17, 1988, Ser. No. 233,137

Claims priority, application Fed. Rep. of Germany, Aug. 21, 1987, 3728369

Int. Cl.[4] G01N *29/04*

U.S. Cl. 73—622 **23 Claims**



1. An ultrasound pulse echo method for detecting cracks in a shaft using a test head coupled to an end face of the shaft, which emits a series of ultrasound pulses of a given frequency and receives a series of reflected sound echoes in a sound receiver contained in the test head and recorded by an evaluation device, the method comprising the steps of:

(a) placing the test head on the end face of the shaft at a radial distance from a central axis of the shaft via an adjustable mechanical device coupled to said shaft;

(b) delivering sound pulses having a high frequency in the range of 4 to 8 MHz from the test head for conducting measurements; and

(c) displacing the test head in the course of the measurements at least over part of the circumference of a circle defined by the radial distance of the test head from the central axis.

4,893,512

SWINGING-TYPE AUTOMATIC EXAMINATION APPARATUS FOR PIPING

Kenichi Tsuimoto, Ibaraki, and Osamu Kakuma, Uozu, both of Japan, assignors to Doryokuro Kakunenryo Kaihatsu Jigyodan and Sugino Machine Limited, both of, Japan

Filed May 17, 1988, Ser. No. 196,172

Claims priority, application Japan, Jun. 12, 1987, 62-146437

Int. Cl.[4] G01N *29/04*

U.S. Cl. 73—622 **9 Claims**

1. An automatic pipe examination apparatus for scanning and examining at least one pipe, comprising:

a pair of bodies slidable connected to each other such that the total length of the pair of bodies along a longitudinal axis thereof is adjustable;

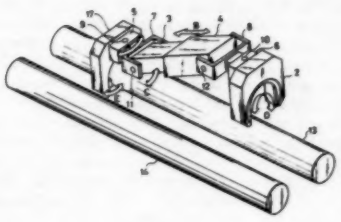
a first drive means for driving said pair of bodies along said longitudinal axial length;

a pair of couplings each connected to one of said bodies in a manner such that each of said pair of couplings is movable with respect to one of said bodies within a first plane parallel to said longitudinal axis;

a pair of second drive means for driving each of said pair of couplings within said first plane;

a pair of gear boxes each connected to each of said pair of couplings in a manner such that each of said pair of gear boxes is movable with respect to said each of said pair of couplings within a second plane perpendicular to said first plane;

a pair of third drive means for driving each of said pair of gear boxes within said second plane; and



a pair of clamping devices each connected to each of said pair of gear boxes and each extending in a third plane substantially perpendicular to said longitudinal axis and to said second plane, each clamping device being provided with a clamping means for reasonably clamping said at least one pipe; and

at least one scanning means movably positioned within at least one of said clamping device for examining the circumferential surfaces of said pipe.

4,893,513

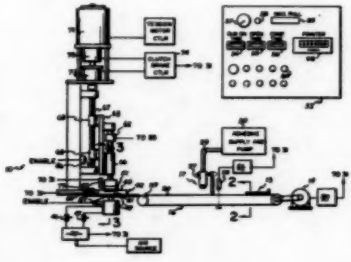
METHOD AND APPARATUS FOR BOND TESTING

Joseph G. Schroeder, Bay Village; Jan L. Shanaberger, Westlake; William R. Rehman, Vermilion; Harry J. Leder, Lakewood, and Jeffrey S. Noss, Bay Village, all of Ohio, assignors to Nordson Corporation, Westlake, Ohio

Filed Nov. 1, 1988, Ser. No. 265,719

Int. Cl.[4] G01N *3/08*

U.S. Cl. 73—827 **25 Claims**



1. An apparatus for measuring the strength of an adhesive bond between two substrates comprising:

a dispenser adapted to supply an adhesive to a first of said substrates;

compressor means adapted to apply compressive force between said first substrate and a second substrate for a preselected compression time to form an adhesive bond therebetween;

means for pulling one of said adhesively bonded substrates from the other of said substrates at a substantially constant rate of speed to break said adhesive bond; and

a load cell operatively associated with said pulling means adapted to measure the force applied to said adhesive bond.

4,893,514

DEVICE FOR MEASURING FORCES IN METAL SPINNING LATHES

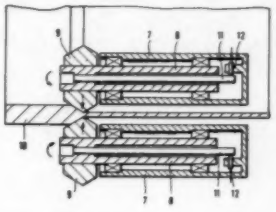
Heinz Grönert, Emmering; Jochen Vetter, Karlsfeld; Manfred Eckert, Dachau; Henning von Petersdorff, Puchheim, and Johann Münich, Munich, all of Fed. Rep. of Germany, assignors to MAN Technologies GmbH, Munich, Fed. Rep. of Germany

Filed Jul. 15, 1988, Ser. No. 220,003

Claims priority, application Fed. Rep. of Germany, Aug. 25, 1987, 3728313

Int. Cl.[4] G01L *5/00*

U.S. Cl. 73—862.55 **5 Claims**



1. A spinning lathe comprising

a support,

a plurality of spinning means on said support for applying radial forming forces to a workpiece, each spinning means comprising:

a housing secured to said support

a spindle rotatably supported in said housing, said spindle having opposite ends,

a spinning roll secured to said

spindle proximate one of the ends thereof,

said spindle having a coaxial bore therein with an open end,

a detector rod in said bore, said detector rod being secured to the spindle in a region at which the spinning roll is secured to the spindle,

said detector rod having an end projecting out of said open end of said bore and beyond said spindle, said end of said rod being free and unsupported and undergoing displacement in response to application of force to said spindle by said roll, and

sensor means fixed to said housing adjacent to the projecting end of said rod for measuring displacement of said end of the rod without physical contact therewith, said sensor means laterally facing said projecting end of said rod to measure said displacement by measuring the distance between said end of said rod and the sensor means.

4,893,515

SAMPLE-SUCKING CONDITION CHECKING METHOD AND SYSTEM

Makoto Uchida, Ootawara, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 94,878, Sep. 10, 1987, abandoned. This application Dec. 20, 1988, Ser. No. 287,553

Claims priority, application Japan, Sep. 18, 1986, 61-218006

Int. Cl.[4] G01N *1/14*

U.S. Cl. 73—864.34 **8 Claims**

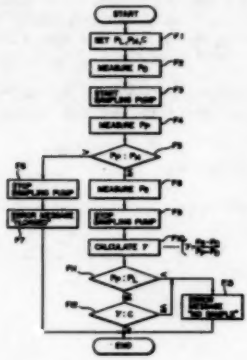
6. A sample-sucking condition checking system comprising:

sampling nozzle to be immersed into a sample;

sampling pump connected to the sampling nozzle through a tube for sucking the sample;

pressure sensing means for measuring a first suction pressure value P_o at the sampling nozzle before suction of the

sample starts, a second suction pressure value P_ρ at the sampling nozzle when the suction speed of the sampling pump reaches a maximum level during the suction of the sample, and a third suction pressure value P_σ at the sampling nozzle when the suction speed of the sampling pump reaches a middle level before completion of suction of the sample; and



comparing means for comparing a first change between the first suction pressure value P_σ and the second suction value P_ρ with a second change between the first suction pressure value P_σ and the third suction pressure value P_σ to determine whether or not sample-sucking condition is normal.

4,893,516

METAL CONTACT MEMBER FOR A MEASURING LANCE FOR TAKING MEASUREMENTS IN METAL MELTS

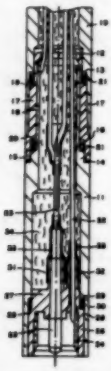
Johan M. J. Knevels, Brse, Belgium, assignor to Electro-Nite International NV, Antwerpen, Netherlands

Filed Jan. 31, 1989, Ser. No. 304,982

Claims priority, application Fed. Rep. of Germany, Feb. 17, 1988, 3804880

Int. Cl.[4] C21B 7/24

U.S. Cl. 73—866.5 **8 Claims**



1. A metal contact member for disposal at an end of a measuring lance, said contact member having an end adapted to receive a consumable probe so as to electrically connect said probe to leads running through said contact member, said probe containing measuring means for taking measurements in metal melts, the contact member comprising two tubes, one tube having a tapered portion and the other tube having a widened opening portion, a sleeve-shaped insulating member interposed between said tapered portion of said one tube and said widened portion of said other tube, said insulating member having a flanged portion, the two tubes having outer wall portions abutting said flanged portion of the insulating member and having substantially the same outside diameter as the insulating member at said flanged portion, and a cup-shaped insulating member forming a part of the interior of said end of the contact member, the cup-shaped insulating member having a base and an interior, said interior of the cup-shaped member containing contacts which are insulated from one another and which are connected, through the base of the cup-shaped insulating member, to said leads, first means (21) for providing a water-tight seal between said sleeve-shaped insulating member (17) and the tapered portion (14) of said one tube (11) and between said sleeve-shaped insulating member and the widened portion (12) of said other tube (10), and second means (30) for providing a watertight seal between said cup-shaped insulating member (26) and said one tube.

8. A measuring lance for measuring oxygen or other activity of molten metal, said lance including a contact member for electrical connection to a consumable measuring probe, said contact member comprising first and second metal tubes and a sleeve-shaped insulating member telescopically interconnecting said tubes, said tubes and sleeve-shaped member being configured so as to define one gap between said sleeve-shaped member and one of said tubes and another gap between said sleeve-shaped member and the other of said tubes, and means disposed in each gap for providing a water-tight seal between said sleeve-shaped member and each of said tubes.

4,893,517

CONTINUOUSLY VARIABLE TRACTION ROLLER TRANSMISSION

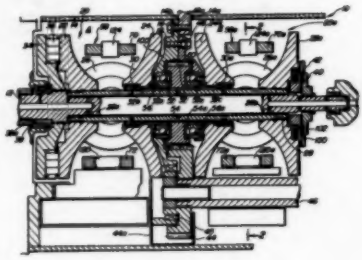
Masaki Nakano, Kawasaki, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Feb. 24, 1989, Ser. No. 314,846

Claims priority, application Japan, Mar. 7, 1988, 63-52977

Int. Cl.[4] F16H 15/12

U.S. Cl. 74—200 **12 Claims**



1. A continuously variable traction roller transmission of a double cavity type, comprising:

a casing;

a partition wall structure installed in said casing to define front and rear cavities in the same;

a first shaft extending through said front and rear cavities;

first and second motion transmitting traction mechanisms respectively installed in said front and rear cavities and disposed about said first shaft, each mechanism being operatively connected to the first shaft and including opposite paired input and output toroidal discs and paired

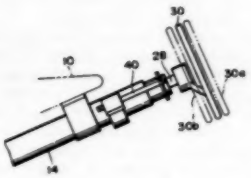
traction rollers disposed between and in engagement with the paired input and output toroidal discs;
a second shaft extending through only said rear cavity;
first means for operatively connecting said second shaft to both of said first and second motion transmitting traction mechanisms;
second means for biasing one of the paired input and output discs of each motion transmitting traction mechanism toward the other in accordance with a magnitude of torque applied to said one disc;
third means for constantly biasing one of the paired input and output discs of each motion transmitting traction mechanism toward the other; and
fourth means for rotatably mounting adjacent two of the discs of the respective first and second motion transmitting traction mechanisms to said partion wall structure.

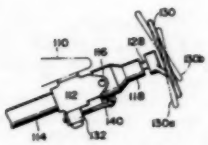
4,893,518

ELECTRIC STEERING APPARATUS

Sakae Matsumoto, Takasaki, and Mitsuo Ichikawa, Maebashi, both of Japan, assignors to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 6, 1988, Ser. No. 178,229
Claims priority, application Japan, Apr. 17, 1987, 62-57545[U]
Int. Cl.[4] B62D 1/18
U.S. Cl. 74—493 **10 Claims**





1. An electric steering apparatus comprising:
a lower column fixed to a vehicle body and having a housing provided thereon;
an upper column having a tilting pivot portion and a screw shaft pivot portion, said upper column being pivotally attached to said lower column at said tilting pivot portion so as to be tiltable with respect to said lower column;
a lower shaft rotatably received in said lower column and having a first end and a second end, said first end being connected to a steering gear;
an upper shaft rotatably received in said upper column for tilting with said upper column and having a first end connected to a steering wheel and a second end connected to said second end of said lower shaft through a universal joint such that an angle formed between respective axes of said upper and lower shafts may be changed by tilting of said upper shaft with said upper column;
a screw shaft having a non-threaded first end portion pivotally connected directly to said screw shaft pivot portion of said upper column, and a second end portion formed with a screw thread;
nut means rotatable by an electric motor and having a threaded portion engaged with said screw thread of said screw shaft;
ball bearing means mounted in said housing and comprising two inner races provided on a surface of said nut means, two outer races fitted in said housing, and two groups of balls provided between said inner races and said outer races, said ball bearing means being mounted in said housing in such a manner as to support said nut means for rotation relative to said screw thread and as to prevent said nut means from moving in an axial direction of said lower column and from moving in a direction perpendicular to said lower column, said screw shaft thus moving in the axial direction of said lower column upon rotation of said nut means by said motor while pivoting relative to said screw shaft pivot portion;
aligning means for aligning a rotational axis of said nut means with an axis of said screw shaft during said pivoting of said screw shaft; and
back-lash eliminating means for eliminating back-lash by pressing on said non-threaded portion of said screw shaft such that said screw thread presses against said threaded portion of said nut means.

5. An electric steering apparatus comprising:
a lower column fixed to a vehicle body and having a housing provided thereon;
an upper column telescopically connected to said lower column;
a lower shaft rotatably received in said lower column and having a first end and a second end, said first end being connected to a steering gear;
an upper shaft rotatably received in said upper column for movement with said upper column relative to said lower column and having a first end connected to a steering wheel and a second end connected to said second end of said lower shaft such that the connected second ends may move axially but not rotatably relative to each other;
a screw shaft having a non-threaded first end portion connected to said upper column and a second end portion formed with a screw thread;
nut means rotatable by an electric motor and having a threaded portion engaged with said screw thread of said screw shaft;
ball bearing means mounted in said housing and comprising two inner races provided on a surface of said nut means, two outer races fitted in said housing, and two groups of balls provided between said inner races and said outer races, said ball bearing means supporting said nut means in such a manner as to prevent said nut means form moving in an axial direction of said lower column but to permit said nut means to rotate relative to said screw shaft, said screw shaft thus moving in the axial direction of said lower column upon rotation of said nut means by said motor;
first back-lash eliminating means for eliminating back-lash by pressing said non-threaded portion of said screw shaft so that said screw thread of said screw shaft presses against said threaded portion of said nut means; and
second back-lash eliminating means for eliminating back-lash by pressing said ball bearing means so that esch said inner race presses against a corresponding said outer race through an associated one of said groups of balls.

4,893,519

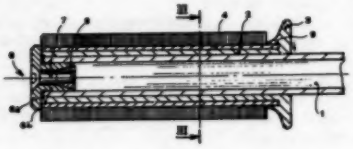
HANDLEBAR GRIP

Riccardo Corso; Roberto Maccioni, and Giuliano Pasuglia, all of Viareggio, Italy, assignors to Sandro Mentasti & C. S.a.S., Varese, Italy

Filed Aug. 11, 1988, Ser. No. 230,905
Int. Cl.[4] B62K 21/26
U.S. Cl. 74—551.9 **7 Claims**

1. A handgrip for a handlebar comprising a tubular body covering an extremity of the handlebar, wherein said tubular

handgrip body has a covering formed by a plurality of densely distributed flexible needles extending from an external cylindrical surface of said body, wherein said needles are made of a material belonging to the group composed of stainless steel,

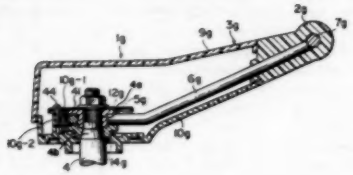


polyamides polyolefins and carbon fibers, and having a modulus of elasticity sufficiently high to produce flexible needles, said needles having a length comprised between 2 and 10 millimeters.

4,893,520
STEERING WHEEL

Tetsuji Endo, Fujinomiya, and Kazuyoshi Nishijima, Shizuoka, both of Japan, assignors to Nihon Plast Co., Ltd., Fuji, Japan

Continuation of Ser. No. 933,418, Nov. 21, 1986, Pat. No. 4,777,840. This application Jun. 22, 1988, Ser. No. 209,823
Claims priority, application Japan, Jan. 14, 1986, 61-5975; Mar. 20, 1986, 61-63382
The portion of the term of this patent subsequent to Oct. 18, 2005, has been disclaimed.
Int. Cl.[4] B62D *1/04*
U.S. Cl. 74—552 **3 Claims**



1. A steering wheel for a vehicle comprising: a rim section including a rim core of metal, a hub section including a metallic hub for securing said steering wheel to a steering shaft of the vehicle, and at least one spoke core interconnecting said metallic hub and said rim core, said metallic hub comprising a first hub member of a metal defining therein a fire through-hole for said steering shaft and a second hub member of a metal defining therein a second through-hole for said steering shaft and disposed in axially aligned relationship to said first hub member, said first and second hub members having opposed surfaces, said spoke core having a portion disposed between and fixed to said opposed surfaces of said hub member for securing together said first and second hub members and said portion of said spoke core, said hub members have means for positioning said hub members one to the other, said positioning means comprising an engagement protrusion and recess formed on and in said hub members adjacent to said opposed surfaces and disposed substantially coaxially with said first and second through-holes, respectively, said engagement protrusion and recess, respectively, having end face and bottom face disposed in abutment engagement with each other to position said hub members in the axial direction thereof, said engagement protrusion and recess further having peripheral surfaces disposed in engagement with each other to position said hub members in the rotational direction, said portion of said spoke core being welded to said opposed surfaces of said hub members.

4,893,521
STEERING WHEEL

Syuichi Ishida, Ichinomiya; Shinichi Goto, Nagoya, and Kimio Muramatsu, Okazaki, all of Japan, assignors to Toyoda Gosei Co., Ltd., Nishikasugai, Japan

Filed Nov. 14, 1988, Ser. No. 271,387
Claims priority, application Japan, Feb. 14, 1986, 61-031581; Feb. 14, 1986, 61-031582
Int. Cl.[4] B62D *1/06*
U.S. Cl. 74—552 **13 Claims**

1. A steering wheel comprising:
an operating portion;
a hub portion for connection with a steering shaft, said hub portion being located generally centrally of said operating portion;
a spoke portion connecting said operating portion to said hub position for transmitting steering motion applied to said operating portion, to the steering shaft via the spoke portion and the hub portion;
an impact energy absorbing member located on said hub portion for absorbing impact energy;
a pad covering said impact energy absorbing member and said spoke portion, said pad including a hard insert integrally covered by a soft cover member, said hard insert comprising a plurality of separate hard insert parts which are divided from one another by at least one bendable portion each of which provides a line of preferential bendability, whereby said pad can be bent when a force impacts said soft cover member, by causing bending movement of said parts along at least one said line of preferential bendability

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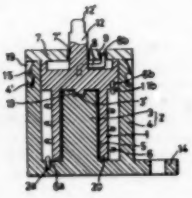
4,893,522
ROTARY DAMPER

Masaru Arakawa, Chigasaki, Japan, assignor to Nifco, Inc., Yokohama, Japan

Filed Jun. 30, 1988, Ser. No. 213,872
Claims priority, application Japan, Jul. 10, 1987, 62-171232
Int. Cl.[4] F16F *15/10*
U.S. Cl. 74—574 **12 Claims**



1. A rotary damper, which comprises:
a cylindrical rotor for receiving a torque input;
a bore defined within a first end of said cylindrical rotor;
a housing having a shaft disposed within said bore of said cylindrical rotor and a cylindrical wall surrounding said shaft;
a viscous fluid interposed between sidewall portions of said bore of said cylindrical rotor and said shaft of said housing;
a coil spring, interposed between said cylindrical wall of said

housing and said cylindrical rotor and having one end secured to said housing and another end secured to said cylindrical rotor, so as to be wound up as a result of rotation of said cylindrical rotor caused by said torque input;

a cover secured to an open end of said cylindrical wall of said housing and having an inner surface facing a second end of said cylindrical rotor;

an excursion groove defined within said inner surface of said cover and having an end portion with a heart-shaped cam groove formed therein; and

an operating pin having one end thereof fixedly secured within said cylindrical rotor and another end thereof disposed within said excursion groove of said cover so as to be capable of excursion along said excursion groove.

4,893,523

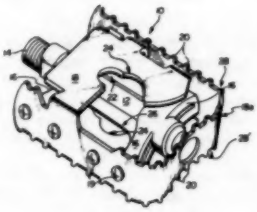
BICYCLE AND PEDAL SYSTEM

Dan C. Lennon, Box 1177, Hailey, Id. 83333

Filed Jan. 7, 1988, Ser. No. 142,049

Int. Cl.[4] G05G 1/14

U.S. Cl. 74—594.6 **45 Claims**



1. A bicycle pedal system comprising:

a flanged stud mountable to a bicycle rider's shoe to depend from the rider's shoe, said flange forming an enlarged lowermost portion of the stud;

a pedal having a perimeter portion and comprising:

a shaft mountable to a bicycle; and platform means secured to said shaft for supporting a bicycle rider, said platform means including a slot for engaging the flange of said stud and for restraining said stud from movement with respect to said platform means while allowing said stud to rotate when restrained by said slot, said platform means further including a free zone defined by an opening between said slot and the perimeter of said pedal in which said stud may be disposed in a disengaged position in said free zone by movement of said stud from said slot during pedaling, said free zone extending from said slot through the perimeter of the platform means, whereby the pedal system can be utilized in an engaged or disengaged position by the bicycle rider.

4,893,524

HST SYSTEM AXLE DRIVING APPARATUS

Ryota Ohashi, Kobe, and Masahisa Kawamura, Amagasaki, both of Japan, assignors to Kanzaki Kokyukoki Mfg. Co. Ltd., Japan

Filed Nov. 15, 1988, Ser. No. 271,311

Claims priority, application Japan, Nov. 21, 1987, 62-177885[U]

Int. Cl.[4] F16H 47/04

U.S. Cl. 74—687 **4 Claims**

1. A hydrostatic-transmission-type axle driving apparatus, comprising

a transmission casing including a first axle casing and a second axle casing;

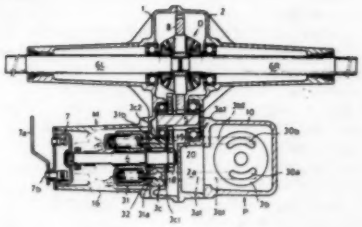
a first axle disposed within said first axle casing; a second axle disposed within said second axle casing;

a motor casing attached to a side surface of said first axle casing;

a hydraulic motor disposed within said motor casing, said hydraulic motor including a motor cylinder block and a motor shaft disposed in parallel to said first and second axles;

a motor cylinder block oil passage formed in said motor cylinder block;

a pump casing attached to a side surface of said second axle casing;



a hydraulic pump disposed within said pump casing, said hydraulic pump including a pump cylinder block disposed at a bottom surface of said pump casing, and a pump shaft disposed perpendicular to said first and second axles;

a pump cylinder block oil passage formed in said pump cylinder block;

a pump casing oil passage formed in said pump casing in communication with said pump cylinder block oil passage; and

an axle casing oil passage formed in said first and second axle casings, said axle casing oil passage connecting said pump casing oil passage with said motor cylinder block oil passage.

4,893,525

CENTRALIZED WET-BRAKE AND OTHER IMPROVEMENTS FOR RUNNING GEARS WITH ADJUSTABLE WHEEL TRACK

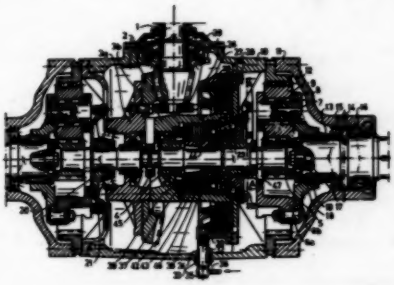
Szalai Gábor, Győr, Hungary, assignor to Magyar Vagon es Gepgyar, Gyor, Hungary

Filed Mar. 11, 1988, Ser. No. 166,889

Claims priority, application Hungary, Mar. 26, 1987, 1317/87

Int. Cl.[4] F16H 1/44.5

U.S. Cl. 74—710.5 **5 Claims**



1. A differential gear mechanism for vehicle wheels which comprises:

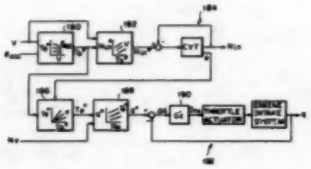
(a) a main housing including first and second spaced end walls,
(b) first and second tapered-roller bearings supported by said main housing end walls,
(c) an equalizer gear housing within said main housing and rotatably supported at each end by said bearings,
(d) said equalizer gear housing comprising first and second axially joined gear housing parts,
(e) said first gear housing part mounting an annular crown gear and being supported by said first bearing,
(f) said first and second gear housing parts defining, in the region of their joining, a first chamber for first and second differential output bevel gears connected by bevel idler gear means,
(g) said second gear housing part being rotatably supported by the outer race of said second bearing and further defining an open ended chamber adjacent to and opening toward said second main housing end wall,
(h) first and second output half-shafts rotatably supported in said main housing and mounting said first and second output bevel gears,
(i) said second half-shaft extending coaxially through said open ended chamber and defining therewith an annular space located between said first chamber and said second housing end wall,
(j) said second housing part being provided on its outer surface with a longitudinally extending external spline,
(k) an annular brake housing member secured to said second spaced end wall of said main housing and forming a wet brake chamber,
(l) said brake housing member having a longitudinally extending internal spline on an internal surface thereof, spaced from and facing said external spline,
(m) a plurality of annular braking discs received within said brake chamber,
(n) alternate ones of said discs being slideably but non-rotatably associated with said respective internal and external splines, and
(o) means within said wet-brake chamber for applying axial pressure to said braking discs tending to inhibit rotation of said gear housing within said main housing.

4,893,526

CONTINUOUS VARIABLE TRANSMISSION CONTROL SYSTEM

Setsuo Tokoro, Susono, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Sep. 17, 1987, Ser. No. 98,531
Claims priority, application Japan, Sep. 19, 1986, 61-219838; Sep. 19, 1986, 61-219839; Oct. 3, 1986, 61-234527; Oct. 4, 1986, 61-235484; Oct. 4, 1986, 61-235485
Int. Cl.[4] B60K *41/14*
U.S. Cl. 74—866 **27 Claims**



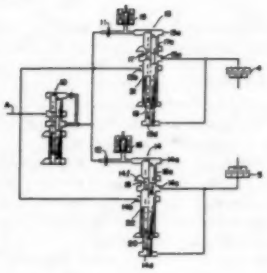
1. A system for driving a vehicle, comprising:
an internal combustion engine;
an accelerator member operable by a driver;
a torque control means provided in said internal combustion engine for controlling an output torque of the internal combustion engine;
an actuator means for operating the torque control means independently of an amount of depression of the accelerator member;
a transmission device having an input shaft connected to the engine, an output shaft connected to the vehicle and actuator means for obtaining a continuously varied speed ratio between the input shaft and the output shaft;
a first calculating means for calculating a target speed of the input shaft of the transmission device;
a first detecting means for detecting an actual speed of the input shaft of the transmission device;
a transmission control means for controlling the transmission device for varying the speed ratio so that an actual speed of the input shaft conforms to the target speed;
a second calculating means for calculating a target value of a torque of the engine;
a second detecting means for detecting an engine parameter related to an intake air amount characteristic of the internal combustion engine; and
a feedback means, responsive to the detected intake air amount characteristic, for providing a feedback signal to an operating signal generating means, responsive to the feedback signal, for providing an operating signal directed to the torque control means to obtain the target torque.

4,893,527

SPEED CHANGE CONTROL APPARATUS FOR AUTOMATIC TRANSMISSIONS

Choji Furusawa, Aichi; Masato Shimei, Nagoya; Toshiaki Ishiguro, Nagoya; Katsuhiko Hattori, Nagoya, and Hiroyuki Yamaguchi, Aichi, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya and Kabushiki Kaisha Toyota Chuo Kenkyusho, Aichi, both of, Japan

Filed Sep. 23, 1987, Ser. No. 100,364
Claims priority, application Japan, Sep. 24, 1986, 61-223841
Int. Cl.[4] B60K *41/18*
U.S. Cl. 74—866 **19 Claims**



1. Speed change control apparatus in an automatic transmission having a plurality of friction elements in which a gear stage is established by engaging one of the friction elements and disengaging one of the others, said speed change control apparatus comprising:
control valves connected to respective ones of said friction elements, each control valve having a control oil line for supplying it with control hydraulic pressure;
a duty solenoid valve connected to the control oil line of each control valve; and
control means for engaging one friction element by outputting an engagement duty signal to one duty solenoid valve to control its control hydraulic pressure, and for simultaneously disengaging one of the other friction elements by outputting a disengagement duty signal to one of the other duty solenoid valves to control its control hydraulic pressure.

4,893,528

ADJUSTABLE SPANNER

Chang Chung-Hsing, No. 5, Chang Ma Street, Ma Hsing Village, Shiow Shuei Shi, Chang Hsuah, Taiwan

Filed Mar. 21, 1989, Ser. No. 326,342
Int. Cl.[4] B25B 13/28
U.S. Cl. 81—100 8 Claims

1. An adjustable spanner comprising:
a handle having a mounting end which includes an upper nose portion having a pressure edge, and a lower thinned portion defining, at a bottom of said nose portion, a first wall and a second wall, said second wall being inclined with respect to said first wall;
a movable piece having an upper gripping portion have an inward multi-angular surface capable of cooperating with said pressure edge to grip therebetween a tubular article, and a lower engaging portion which is slidably and pivotably mounted on said thinned portion and includes a groove defining therein a plurality of indentations and a side wall means for flushly engaging with either one of said first and second walls; and
a pivot means extending through said groove for selectively engaging one of said indentations and for pivotally mounting said lower engaging portion to said thinned portion, wherein when said side wall means flushly engages with said second wall, said multi-angular surface and said pressure edge are ready to clamp therebetween said tubular article, when said movable piece is pivoted with respect to said handle, the size of a space formed between said pressure edge and said multi-angular surface is accordingly adjusted, and when said side wall flushly matches against said first wall, said engaging portion is slidable on said thinned portion to allow said pivoting medium to be positioned in any one of said indentations.

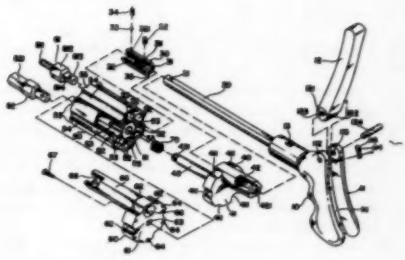
4,893,529

STORAGE TYPE HEXAGONAL SOCKET WRENCH

Schih-Chang Lin, No. 102, Lane 222 Hsin-Chung Rd., Ho-Mei Town, Chang-Hua, Taiwan

Filed Jan. 12, 1989, Ser. No. 296,131
Int. Cl.[4] B25G 1/08; B25B 23/00
U.S. Cl. 81—177.1 3 Claims

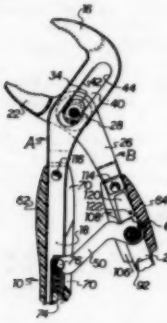
1. A storage type hexagonal socket wrench comprising a handle for manual operation of said wrench,
a driving shaft having a front portion, a rear portion and a hexagonal rod-like configuration,
control means located on said handle and selectively connecting said rear portion of said driving shaft for either clockwise or counterclockwise rotation of said driving shaft,
a socket having a front portion, a rear portion and a hexagonal outer configuration,
said socket having a hexagonal hole in the rear portion thereof which receives said front end of said driving shaft,
said socket also having a pentagonal hole in said front portion,
an opening being positioned between said pentagonal hole and a first exterior side of said socket, said opening having a steel ball and an elastic element located therein,
a longitudinal groove is located on a second exterior side of said socket which is parallel to said first exterior side,
a back seat having a front face, a rear face and comprising a circular block,
a hexagonal tube extending from said rear face and slidably receiving said socket therein,
said hexagonal tube having a flange to form a reduced hexagonal hole for insertion of said driving shaft,
an axle being integral with said back seat and extending from a central portion of said front face,
a rotatable storage wheel having a center is rotably mounted on said axle,
a plurality of hexagonal holes having front and rear ends are located equidistantly around said center of said rotatable storage wheel,
a stop lug being located on said rotatable wheel at the rear end of each hexagonal hole,
a front seat having a front face, a rear face and comprising a circular block,
a hexagonal tube extending from said front face of said front seat,
said hexagonal tube having a flange protruding inward to form a reduced hexagonal hole,



bolt means for connecting said front seat and said rear seat together,
a set of socket wrench elements being positioned in said plurality of hexagonal holes in said rotating storage wheel,
each of said wrench elements having a hexagonal central portion of a size suitable for sliding in said plurality of hexagonal holes and in the hexagonal tube of said front seat,
each of said wrench elements also having a rear portion for insertion in said socket,
said rear portion being a pentagonal post with a slot therein for receiving said steel ball to firmly fix the connection after said rear portion is inserted into said pentagonal hole of said socket,
whereby the following procedure may be followed in order to select a desired wrench element, the driving shaft is pulled backward to let said socket be separated from the pentagonal post of an engaged wrench element so that the driving shaft is positioned in the hexagonal tube of said back seat while the hexagonal central portion of the wrench element is stopped by a stop lug of said rotatable wheel and retained inside thereof, then said rotatable wheel is revolved so that the selected socket wrench element is aligned with the hexagonal tube of said back seat, then, said driving shaft is pushed forward to drive the pentagonal post of the selected socket wrench element, thereafter, said driving shaft is continuously pushed forward so that the desired socket wrench element is forced

to protrude beyond the hexagonal hole of said front seat to form an operative hexagonal socket wrench.

4,893,530
PLIER-TYPE TOOL
William A. Warbelt, 121 Iroquois Dr., Butler, Pa. 16001
Filed Mar. 19, 1987, Ser. No. 27,799
The portion of the term of this patent subsequent to May 5, 2004, has been disclaimed.
Int. Cl.[4] B25B *7/04*
U.S. Cl. 81—409.5 **23 Claims**



1. A plier-type tool for automatically gripping workpieces of different sizes, comprising:

first and second rigid elongated body members each having a jaw end, a handle end, and an intermediate neck portion;

slidable and pivotable fastening means connecting the body members between their neck portions and permitting the jaw ends to move toward each other in a sliding action in response to an initial manual force being applied to close the handle ends toward each other to grasp a workpiece between the jaw ends;

the fastening means including an elongated slot in the neck portion of a first of the body members and a pawl pivotably secured to the neck portion of the second body member and disposed to slide within the slot;

the fastening means being responsive to the jaw ends contacting the workpiece such that the sliding action is arrested by the pawl pivotally engaging a long edge of the slot and continued manual force on the body members causes a pivoting gripping action of the jaw ends against the workpiece; and

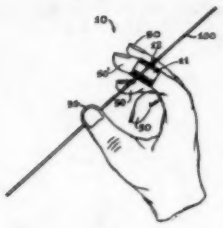
means operatively engaged to the pawl which acts to normally urge the pawl out of engage with the long edge of the slot.

4,893,531
WELDING ACCESSORY APPARATUS
Harry P. Stolz, II, 768 E. Fifth Ave., Durango, Colo. 81301
Filed Oct. 21, 1988, Ser. No. 260,744
Int. Cl.[4] B25B *33/00*
U.S. Cl. 81—487 **3 Claims**

1. A welding accessory apparatus for the manipulation, positioning and feeding of an elongated filler rod during the welding process wherein the apparatus comprises:

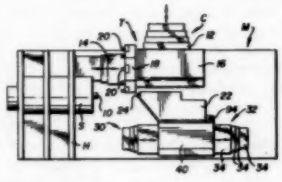
a finger encircling unit including a ring member adapted to engage one of a welders fingers; wherein, the ring member is provided with at least one raised attachment member which projects radially outwardly from the ring member and has a central aperture formed therein; wherein, the axis of the said central aperture is disposed generally perpendicular to the axis of said ring member; and,

a friction unit operatively associated with said finger encircling unit wherein the friction unit comprises: a resilient



insert member adapted to be received in said raised attachment member.

4,893,532
BREAK AWAY TOOL ELEMENT AND METHOD OF MOUNTING
Harold E. Walburn, Elmira; Jayesh B. Patel, Horseheads, and Jeffery W. Thomason, Odessa, all of N.Y., assignors to Hardinge Brothers, Inc., Elmira, N.Y.
Filed May 26, 1988, Ser. No. 199,090
Int. Cl.[4] B23B *23/00, 19/00*
U.S. Cl. 82—148 **25 Claims**



1. Break away machine tool assembly, comprising:

(a) a support;

(b) a bearing plate overlying and contiguous said support and movable relative thereto;

(c) a tool element overlying and contiguous said plate and movable therewith;

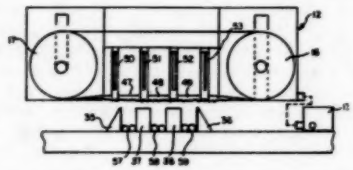
(d) means releasably secure said plate and said element in overlying relation to said support for permitting said plate and said element to move relative to said support within a defined range upon being subject to an impact;

(e) said releasable securing means includes a plurality of corresponding cooperating slots disposed in said support and said plate, a plurality of securement elements extend from said tool element through said plate and said support slots and said securement elements are movable relative to said support slots for permitting said plate and said tool element to move relative to said support, and there are at least two longitudinally extending slots in said support and each slot is angularly disposed relative to the other slot;

(f) three securement elements extend from said tool element and said securement elements are triangularly disposed; and,

(g) two of said securement elements extend through said slots and the remaining securement element defines a pivot axis for said plate and said tool element.

4,893,533
BAND SAW HAVING MORE THAN TWO BLADE GUIDES
Gerald R. Harris, P.O. Box 1148, Pryor, Okla. 74362
Filed May 16, 1988, Ser. No. 194,484
Int. Cl.[4] B23D 55/08
U.S. Cl. 83—13 23 Claims



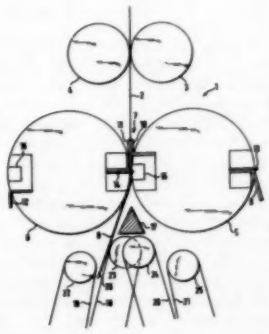
2. A method for cutting multiple workpieces simultaneously with a band saw apparatus having a continuous loop saw blade comprising:

aligning and clamping multiple workpieces in a vise assembly in side-by-side spaced apart relation;

rotating said continuous loop saw blade and guiding said saw blade in a cutting orientation along at least two side-by-side spaced apart cutting stretches by means of at least three aligned blade guide assemblies, each of said cutting stretches being between two adjacent blade guide assemblies; and

displacing said saw blade and said workpieces with respect to one another to contact each of said saw blade cutting stretches with said workpieces to effect cutting thereof while continuing said guiding step by each of said blade guide assemblies throughout cutting.

4,893,534
COMBINATION WEB CUTTING AND PATH SWITCHING SYSTEM
Ingo Köbler, Anhausen, Fed. Rep. of Germany, assignor to Man Roland Druckmaschinen AG, Fed. Rep. of Germany
Filed Jun. 15, 1988, Ser. No. 207,145
Claims priority, application Fed. Rep. of Germany, Jun. 30, 1987, 3721515
Int. Cl.[4] B26D 1/40; B65H 35/08
U.S. Cl. 83—107 16 Claims



1. Combination web cutting and path switching system for web substrates (2), such as printed paper webs, having

means (3, 4) for supplying the web (2) to the system, the system comprising

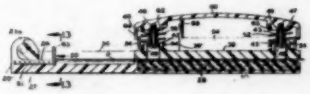
a cutter cylinder and counter cylinder pair (5, 6) having a plurality of cutter knives;

two removal paths (18, 19; 20, 21) located essentially symmetrically with respect to the nip of the cylinder pair,

and comprising, in accordance with the invention,

elastic deflection elements (9, 10; 11, 12) located on the cutter cylinder and counter cylinder pair (5, 6), said deflection elements being positioned relative to the direction of rotation, behind one of the plurality of cutter knives, for deflection of the leading edge of the web into one of the removal paths (18, 19; 20, 21) before the web is severed by one of the plurality of cutter knives of the cylinder and counter cylinder pair (5, 6).

4,893,535
SLOT-PUNCHING DEVICE
Glenn D. Bentrim, 7013 NW. 40th St., and Michael A. T. McKnight, 7006 NW. 40th St., both of Coral Springs, Fla. 33065
Filed Sep. 12, 1988, Ser. No. 243,497
Int. Cl.[4] B26F 1/18
U.S. Cl. 83—133 8 Claims



1. A device for punching two narrow slots in a sheet with a straight edge to hold on the sheet a smaller card having a predetermined corner-to-corner diagonal dimension, said device comprising:

first and second members coupled to each other for movement toward and away from each other between an apart position permitting the insertion of the sheet between them and a together position holding said sheet between them;

a stop on one of said members having a flat surface for engagement by said straight edge of the sheet;

said second member having two punches with respective narrow, flat, substantially parallel punch blades theron which extend at a substantial acute angle to said flat surface of the stop and are offset from each other both parallel and perpendicular to said flat surface of said stop, said punch blades being spaced from each other slightly less than said corner-to-corner diagonal dimension of the card;

said first member having means for receiving said punch blades when said first and second members are in said together position;

each of said punches being slidably reciprocable in said second member between a first position away from said first member and a second position projecting from said second member into said first member;

said stop being slidably adjustable on said first member toward and away from said punch blades;

spring means on said second member biasing said punches to said first position;

and a reciprocable head on said second member for displacing said punches to said second position;

said spring means comprising:

a pair of coil springs engaged between said second member and said head to bias them apart;

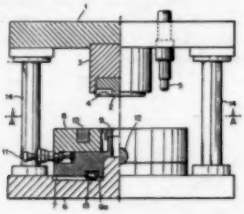
and a pair of coil springs acting between said second member and said punches to hold said punches against said head.

4,893,536

CENTER PUNCHING APPARATUS

Kaoru Kinoshita, Kawagoe, Japan, assignor to Nikka Engineering Co., Ltd., Asaka, Japan

Filed Sep. 6, 1988, Ser. No. 240,811
Claims priority, application Japan, Oct. 7, 1987, 62-251693
Int. Cl.[4] B26F 1/14
U.S. Cl. 83—451 7 Claims



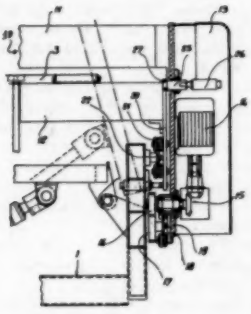
1. A center punching apparatus comprising, an upper die base, an upper die mounted on the upper die base facedown, a lower die base, a rotatable turntable mounted on the lower die base for rotation about an axis coaxial with the upper die, a movable table on the turntable for holding a workpiece of a material to be punched and movable in X and Y directions, a lower die disposed centrally on the turntable coaxial with the upper die, the movable table having an opening circumferentially about said lower die, micrometer means for selectively moving the movable table in X and Y directions independently to accurately position said workpiece relative to the upper die, guide means extending between the upper die base and the lower die base, the lower die base, the turntable, the movable table and the lower die being movable upwardly jointly and guided by said guide means for punching the workpiece with the upper die, and monitor means on the apparatus for monitoring the accuracy of the positioning of the workpiece relative to the upper die by monitoring position of a reference indicium on the workpiece.

4,893,537

APPARATUS FOR CUTTING SINGLE AND DOUBLE GLASS SHEETS

Giorgio Lorenzo, via Pasteur, 7--20017 Passirana di Rho, Milano, Italy

Filed Jul. 14, 1988, Ser. No. 219,347
Claims priority, application Italy, Jul. 17, 1987, 21335A/87
Int. Cl.[4] B26D 3/08, 1/18
U.S. Cl. 83—885 1 Claim



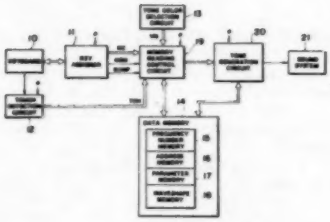
1. An apparatus for cutting either single or double glass sheets, comprising a bearing frame defining a movable-strip supporting table for supporting a glass sheet to be cut, said bearing frame supporting a framework consisting of a upper cross-member and a lower cross-member, adapted for mutual connection, there being moreover provided a upper glass sheet cutting head and a lower glass sheet cutting head movably supported on said cross-members, said supporting table consisting of a plurality of adjoining strips supported by a corresponding plurality of piston members for displacing said strips in a direction substantially perpendicular to said supporting table, said upper cross-member being supported by sidewalls supporting a motor for longitudinal displacement, said motor being coupled, through bevel gears, to a driving pinion meshing with a main rack supported by said bearing frame, said sidewalls supporting guiding carriages engaging with guiding rods coupled to said bearing frame, said lower cross-member being supported by side shoulders provided with small sliding carriages adapted for sliding on auxiliary sliding rods, wherein said apparatus further comprises removable coupling means for coupling said shoulders and sidewalls, consisting of a pawl supported by said sidewalls and driven by a coupling piston member for removably engaging it within a seat formed on said shoulders.

4,893,538

PARAMETER SUPPLY DEVICE IN AN ELECTRONIC MUSICAL INSTRUMENT

Kazuo Masaki, and Mitsumi Kato, both of Hamamatsu, Japan, assignors to Yamaha Corporation, Hamamatsu, Japan

Filed Feb. 26, 1987, Ser. No. 19,528
Claims priority, application Japan, Feb. 28, 1986, 61-43035
Int. Cl.[4] G10H 1/06, 1/46, 7/00
U.S. Cl. 84—605 11 Claims



4. A parameter supply device in an electronic musical instrument comprising: parameter memory means for storing plural sets of parameters in correspondence to plural sets of combinations of parameter determining factors;

address memory means provided for each of said parameter determining factors for storing address data individually in correspondence to each parameter determining factor; and

operation means, capable of operating on address data read out from said address memory means individually in correspondence to each parameter determining factor, for forming an address signal corresponding to a combination of parameter determining factors and reading out a set of parameters from said parameter memory means in response to this address signal;

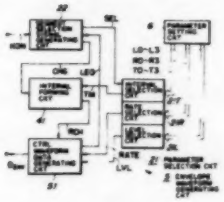
wherein address data stored in a portion of said address memory means corresponding to at least one parameter determining factor is read out in accordance with a combination of said at least one parameter determining factor and data corresponding to at least another parameter determining factor.

4,893,539

CONTROL WAVEFORM GENERATING APPARATUS FOR AN ELECTRONIC MUSICAL INSTRUMENT

Tetsuo Nishimoto, Hamamatsu, Japan, assignor to Yamaha Corporation, Hamamatsu, Japan

Continuation of Ser. No. 48,225, May 11, 1987, abandoned. This application Jun. 30, 1989, Ser. No. 374,636
Claims priority, application Japan, May 13, 1986, 61-109063
Int. Cl.[4] G10H *1/057*
U.S. Cl. 84—663 11 Claims



1. A control waveform generating apparatus for an electronic musical instrument, said control waveform generating apparatus generating a control waveform which comprises a plurality of segment waveforms divided along a time axis to constitute at least a rising portion and a falling portion therein and of which level varies with a lapse of time, said control waveform generating apparatus comprising:

(a) segment designating means for sequentially designating a segment waveform among said plurality of segment waveforms in response to a command signal for generating a control waveform;

(b) control waveform means for generating each designated segment waveform as a part of said control waveform thereby to form the entire control waveform in response to the command signal;

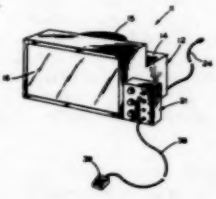
(c) interval forming means coupled with said control waveform forming means for forming, in at least one selectable segment waveform, an interval portion of a selectable length less than the length of the selected segment waveform in which the level of said control waveform is maintained at a selectable constant level.

4,893,540

DISPLAY APPARATUS FOR VISUALLY IMPAIRED PERSONS

Richard M. Friedmar, P.O. Box 2824, Toledo, Ohio 43606

Continuation-in-part of Ser. No. 938,153, Dec. 4, 1986, abandoned. This application Dec. 21, 1987, Ser. No. 135,933
Int. Cl.[4] G09B *15/08*
U.S. Cl. 84—478 15 Claims



1. An apparatus for visually displaying stored information to persons having vision deficiencies comprising:

a housing adapted to be positioned on an upper surface of a piece of furniture and having a stepped upper surface with a rear portion lower than a front portion;

a rear projection viewing screen mounted on a surface of said housing and oriented to be viewed by a person located adjacent the piece of furniture;

means mounted to said rear portion of said housing for individually storing a plurality of images of information each said image photographically reduced in size from an associated original size image having a height and a width;

means for selecting a predetermined one of said stored images from said means for storing and projecting said selected image on said viewing screen as a projected image increased in size wherein the product of the height and width of said projected image is in a range of approximately eighty-seven to one hundred nineteen times the product of a height times a width of said associated original image as a whole;

means mounted to said housing for selectively varying the brightness of said selected image on said viewing screen; and

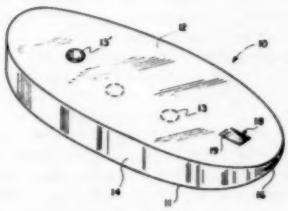
means mounted to said housing for selectively varying the length of time said selected image is projected on said viewing screen whereby a person having a vision deficiency is enabled to recognize said projected image.

4,893,541

PENTATONIC OCARINA

Ilania H. Fowler, P.O. Box 8381, Atlanta, Ga. 30306-0081, and J. Charles Hind, 2301 West North Ave., Anderson, S.C. 29621

Filed May 5, 1988, Ser. No. 190,402
Int. Cl.[4] G10D *7/00*
U.S. Cl. 84—380 C 7 Claims



1. A wind instrument for producing the tones of a specific pentatonic scale, comprising:

an enclosed instrument body having an upper surface, a lower surface, and a wall defining the joining of said upper and lower surfaces, said body enclosing one or more hollow interior chambers;

a mouthpiece located on said wall;

a vent slot in each of said one or more interior chambers disposed within said upper surface of said body and offset from said wall;

a wind passageway having an inlet opening in said mouthpiece and an outlet opening within each of said one or more interior chambers of said instrument body adjacent to said vent slots, said passageway shaped to direct air blown through said mouthpiece against a bottom edge of said vent slot, whereby air within said one or more hollow interior chambers is caused to vibrate; and

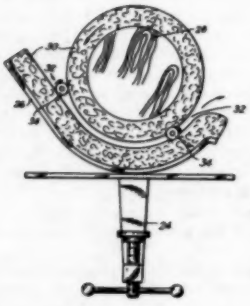
a plurality of at most three per chamber pitch control holes disposed within said upper or lower surfaces of said instrument body whereby, when any selected one or more said holes are opened and closed while air is blown through said mouthpiece and into said instrument body, only notes of said specific pentatonic scale may be produced.

4,893,542

SHELL LUBRICATOR

Peter A. Alsotto, 1668 Hendrickson St., Brooklyn, N.Y. 11234

Filed Dec. 9, 1988, Ser. No. 282,484
Int. Cl.[4] F42B 31/02
U.S. Cl. 86—19 **4 Claims**



1. A shell lubricator, for lubricating the external surface of a shell casing with grease or oil, comprising:

a vertical support member having an upper end and a lower end, said upper end being provided with a bore;

a horizontal support member serving as a base for said shell lubricator, said lower end of said vertical support member being rigidly attached to said horizontal support member;

means for fixedly and removably attaching said horizontal support member to a work surface;

an arcuate, rigid plate having a convex side and a concave side attached to said horizontal support member at a point adjacent to said vertical support member so that said concave side of said arcuate, rigid plate faces away from said horizontal support plate;

a first resilient, absorbent covering capable of holding a lubricating material attached to said concave side of said arcuate, rigid plate;

a rigid, cylindrical roller having two ends, a cylindrical side surface, and an axle protruding from one of said two ends, said axle designed to be passed through said bore in said vertical support member so that the rotation of said axle will cause the rotation of said rigid, cylindrical roller, said rigid, cylindrical roller facing said concave side of said arcuate, rigid plate;

a second resilient, absorbent covering attached to said cylindrical side surface of said rigid, cylindrical roller and being capable of holding a lubricating material, said second resilient, absorbent covering being of a thickness on said cylindrical side surface of said rigid, cylindrical roller that will leave a gap between said second resilient, absorbent covering and said first resilient, absorbent covering on said arcuate, rigid plate so that said rigid, cylindrical roller can freely rotate; and

means for rotating said rigid, cylindrical roller.

4,893,543

BRAIDING MANDREL FOR CABLE GRIP AND STRAIN RELIEF ASSEMBLIES

Raymond J. Phillips, 879 Raymond Hill Rd., Oakdale, Conn. 06370

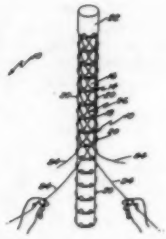
Filed Jul. 5, 1989, Ser. No. 376,271
Int. Cl.[4] D04C 7/00
U.S. Cl. 87—34 **2 Claims**

1. A braiding mandrel comprising:

a wire retainer;

a rod connected to said wire retainer;

a plurality of hook-ring elements placed over said rod and coaxial with said rod; and



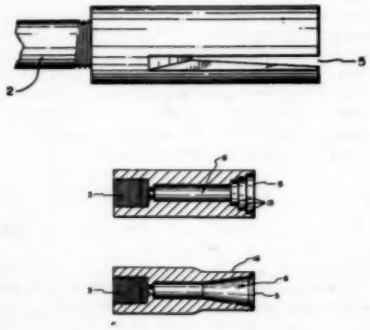
a plurality of spacer elements placed over said rod, coaxial with said rod and said plurality of hook-ring elements, and interspersed with said hook-ring elements.

4,893,544

FLASH SUPPRESSOR

Mark R. Hawley, Kennewick, Wash., and Gerald B. Lucas, Lakeside, Mont., assignors to D. C. Brennan Firearms, Inc., Cincinnati, Ohio

Continuation of Ser. No. 33,518, Apr. 1, 1987, abandoned, which is a continuation of Ser. No. 642,784, Aug. 21, 1984, Pat. No. 4,664,014. This application Sep. 19, 1988, Ser. No. 245,977
The portion of the term of this patent subsequent to May 12, 2004, has been disclaimed.
Int. Cl.[4] F41C 21/18
U.S. Cl. 89—14.2 **9 Claims**



1. A device for suppressing flash from the muzzle of a firearm having a defined nozzle bore and said device having a first end, said first end having means to attach to the muzzle of a firearm said device comprising a shell, said shell comprising:

a first opening and an opposite exit plane opening wherein the ratio of the diameter of said exit plane opening to the diameter of said muzzle bore is from 4 to 14.7;

an inner bore extending from said first opening to said exit plane opening;

said inner bore including a first cylindrical section followed by a main cylindrical section and an outwardly expanding tapered section which extends to said exit plane opening;

said tapered section including from 3 to 6 continuous unrestricted axial slots through walls of said tapered section and which extend to said exit plane opening;

said first cylindrical section having a ratio of diameter to muzzle bore diameter of from greater than 1 to less than 2;

said main cylindrical section having a ratio of diameter to muzzle bore diameter of from 2 to 4;

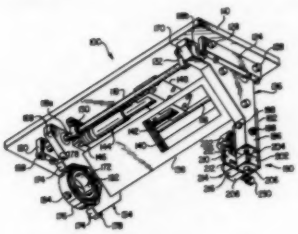
said tapered section having a taper of from 2° to 10°.

4,893,545

AIRCRAFT ARMAMENT APPARATUS

Paul H. Sanderson, 2019 Cripple Creek, Lewisville, Tex. 75067, and Richard C. Serkland, 1010 Meadowlake Dr., McKinney, Tex. 75069

Filed Jan. 13, 1988, Ser. No. 144,873
Int. Cl.[4] F41D *11/26*
U.S. Cl. 89—37.19 12 Claims



1. Recoil shock-absorbing apparatus for mounting a gun on an object, the gun extending generally along a firing axis, said apparatus comprising:

a base member;

attachment means for securing said base member directly to the object;

first and second elongated, essentially straight support members each having a length;

connecting means for securing said first and second elongated support members to said base member in a laterally opposed, mutually spaced and essentially parallel relationship;

a first carriage member carried by each of said first and second elongated support members for movement along their lengths;

a second carriage member carried by each of said first and second elongated support members for movement along their lengths, said second carriage member being spaced apart from said first carriage member among the lengths of said first and second elongated support members,

said first and second elongated support members precluding appreciable movement of said first and second carriage members relative to said base member other than in a direction parallel to the lengths of said first and second elongated support members;

mounting means for supportingly securing axially spaced portions of the gun to said first and second carriage members for movement therewith along the lengths of said first and second elongated support members, said mounting means being operable to selectively lock the gun in a predetermined selectively variable orientation relative to said first and second carriage members in a manner permitting selective adjustment of the firing axis of the gun relative to an axis parallel to the lengths of said first and second elongated support members; and

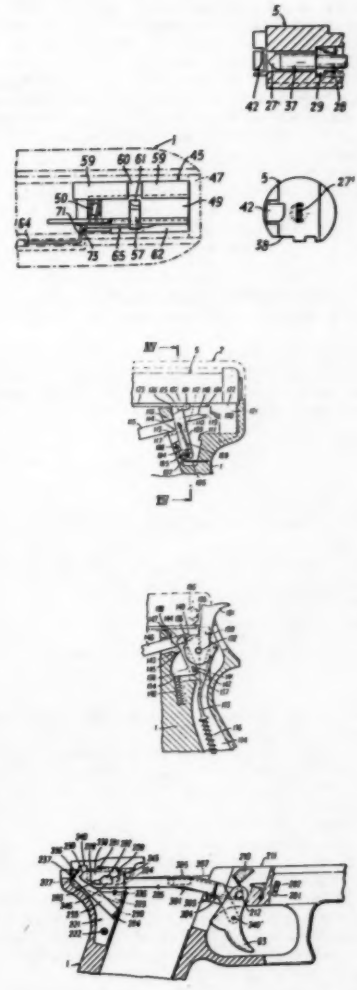
shock absorbing means, operably associated with one of said first and second carriage members, for absorbing and damping the firing recoil force of the gun, said shock absorbing means being directly interconnected between said base member and said one of said first and second carriage members and being positioned between said first and second carriage members.

4,893,546

AUTOMATIC PISTOL

Gaston Glock, Siebenbürger Strasse 16-12, A-1220 Vienna, Austria

Continuation of Ser. No. 733,352, Sep. 6, 1985, abandoned, Continuation of Ser. No. 456,056, Dec. 30, 1982, Pat. No. 4,539,889. This application Aug. 2, 1988, Ser. No. 227,511
Claims priority, application Austria, Apr. 30, 1981, 1944/81
The portion of the term of this patent subsequent to May 2, 2006, has been disclaimed.
Int. Cl.[4] F41C *19/14*
U.S. Cl. 89—145 6 Claims



1. In a pistol, including

a frame having a longitudinal axis and a barrel mounted in the frame;

a slide mounted on the frame so as to be slidable forwardly toward the barrel into a closed position in which the slide is in contact with the barrel, and rearwardly out of a closed position, a recoil spring for biasing the slide into the closed position;

the slide including a breech block, the breech block closing off a cartridge chamber in the closed position of the slide;

a firing pin being mounted longitudinally movable in the breech block and having a nose projecting toward the frame, a firing pin spring for biasing the firing pin, the tension of the firing pin spring being releasable in a direction toward the barrel;

the frame further including a trigger mechanism with a trigger means and an abutment, the abutment being movable by the trigger means from an initial position initially parallel to the firing pin so that the firing pin nose engages the abutment and is moved and the firing pin spring is tensioned, the abutment being further movable in release direction until the abutment and the nose are disengaged;

the slide defining control means which during firing cause the abutment to be moved from the released position into the path of movement of the nose;

the improvement comprising,

the frame including positive guide means serving for maintaining the abutment in the path of motion of the nose of the firing pin at least in a portion of the initial movement of the abutment parallel to the firing pin.

4,893,547

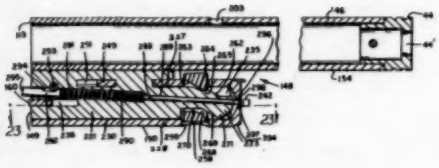
BOLT MECHANISM FOR FIRE ARM

Maxwell G. Atchisson, 6695 Ridgemoore Dr., Doraville, Ga. 30360

Division of Ser. No. 784,157, Oct. 4, 1985, Pat. No. 4,693,170, which is a division of Ser. No. 639,526, Aug. 8, 1984, Pat. No. 4,553,469, which is a continuation of Ser. No. 336,328, Dec. 31, 1981, abandoned. This application Sep. 14, 1987, Ser. No. 96,934

Int. Cl.[4] F41D *5/04*

U.S. Cl. 89—187.01 **7 Claims**



1. Bolt locking mechanism for a firearm including a breech, comprising:

a bolt carrier selectively movable on a predetermined path;

a bolt movable with the bolt carrier either to a forward position relative to the breech of the forearm, or to a rearward position, the bolt carrier being associated with the bolt to allow the bolt carrier a limited extent of forward travel beyond the forward position of the bolt;

cam means associated with the bolt carrier and extending longitudinally of the bolt carrier;

the bolt having a hollow portion within which the cam means moves as the bolt carrier travels relative to the bolt;

lock means movable with the bolt and operable by said cam means, in response to the limited extent of forward travel by the bolt carrier, to move vertically relative to the bolt on a path normal to the path of bolt movement, so as to extend upwardly from the top of the bolt and engage the breech, locking the bolt in the forward position;

the lock means being disposed in the hollow portion of the bolt;

the lock means including surfaces defining a window extending within the hollow portion of the bolt along a path generally parallel to the path of bolt movement, and receiving the longitudinally-extending cam means in operative relation with the window-defining surfaces,

so that the cam means moves the lock means vertically to lock or unlock the bolt as the cam means moves longitudinally within the window in the hollow portion of the bolt.

4,893,548

HYDRAULICALLY OPERATED SWASH-TYPE APPARATUS

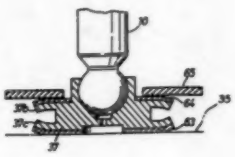
Eiichiro Kawahara; Mitsumasa Furumoto, both of Saitama, and Takashi Koyama, Tokyo, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 14, 1987, Ser. No. 132,192

Claims priority, application Japan, Dec. 12, 1986, 61-296244

Int. Cl.[4] F04B *1/22*

U.S. Cl. 91—499 **7 Claims**



1. A hydraulically operated swash-plate apparatus comprising:

a case;

a cylinder block rotatably supported in said case and having a plurality of axial cylinders arranged in an annular pattern;

a plurality of plungers received respectively in said cylinders;

a swash plate supported in said case and slidably held against free ends of said plungers through a shoe therebetween, said plungers being movable into and out of said respective cylinders by a stroke determined by the angle of inclination of said swash plate; and

said shoe having a body and a sliding surface disposed thereon and slidably held against said swash plate and made of a material having a coefficient of thermal expansion different from that of said body of said shoe, the arrangement being such that said sliding surface becomes convex at a temperature of operation of the apparatus.

4,893,549

ADJUSTABLE AXIAL PISTON MACHINE HAVING A BENT AXIS DESIGN

Franz Forster, Karlstadt/Main-Muhlbach, Fed. Rep. of Germany, assignor to Linde Aktiengelsellschaft, Wiesbaden, Fed. Rep. of Germany

Filed Jul. 28, 1988, Ser. No. 225,284

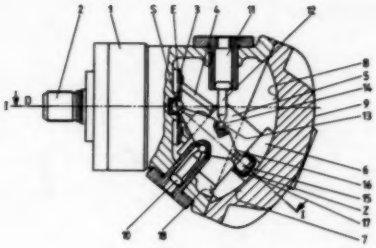
Claims priority, application Fed. Rep. of Germany, Jul. 31, 1987, 3725525

Int. Cl.[4] F01B *3/00, 13/04*

U.S. Cl. 92—12.2 **10 Claims**

1. An adjustable axial piston machine having a bent axis design including a machine housing, a rotatable shaft, a swivel carriage having opposed-faces and a pair of channels formed therein and a cylindrical drum having a first end rotatably supported on said swivel carriage and a second end, one of said channels in said swivel carriage being connected with a fluid feed channel and the other of said channels in said swivel carriage being connected with a fluid discharge channel, means for supporting said second end of said cylindrical drum on said rotatable shaft at a piston guide member surface, said cylindrical drum and said rotatable shaft being rotatable in the

same direction, said cylindrical drum having a plurality of cylindrical bores formed therein and a reciprocable piston located in each of said cylindrical bores in said cylindrical drum, a swivel carriage housing connected to said machine housing forming a concave swivel carriage guide surface, the face of said swivel carriage opposite said cylindrical drum being convex and positioned against said concave guide surface of said swivel carriage housing, the common axis of curvature of the convex face of said swivel carriage and the concave swivel carriage guide surface of said swivel carriage housing



intersects the axis of rotation of said cylindrical drum in said piston guide member surface, a plurality of pairs of counteracting servo piston means for adjusting the angle between the axis of rotation of said cylindrical drum and the piston guide surface to modify the length of the stroke of said pistons within said bores in said cylindrical drum, and at least one support piston having a piston rod pivotably connected to said machine housing and an end connected to said swivel carriage, whereby reciprocation of said serve piston means adjusts the location of said swivel carriage in said swivel carriage housing.

4,893,550

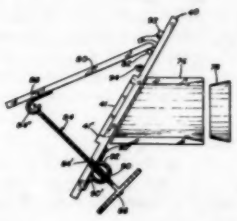
DYNAMIC VENT FOR AUTOMOBILES

Bin-Luh Cheng, 2332 Hampshire Way, Tallahassee, Fla. 32308

Filed Oct. 3, 1988, Ser. No. 252,599

Int. Cl.[4] B60H *1/26*

U.S. Cl. 98—2.02 **20 Claims**



1. A ventilator for a vehicle for mounting in a window of the vehicle, comprising, in combination:

at least one mounting panel for placement in the channel of a vehicular window frame, said at least one mounting panel having at least one opening formed through a portion thereof, said at least one mounting panel defining an interior surface and an exterior surface;

a d.c. powered fan comprising a housing for operative fluid communication with said at least one opening of said at least one mounting panel, said fan having a length taken in the direction from exteriorly to interiorly;

means securing said fan to said mounting panel for juxtaposition and alignment with said opening, said means for securing said fan to said panel so that at least part of said fan projects inwardly and away from said interior surface of said panel; and

means for electrically coupling said fan to a source of d.c. power, whereby said fan causes the exchange of air between the interior of a vehicle and the ambient air;

said at least one mounting panel having a thickness less than said length of said housing.

4,893,551

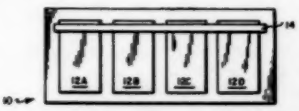
FUME HOOD SASH SENSING APPARATUS

Gordon P. Sharp, Newton, and Jerome J. Schaufeld, Framingham, both of Mass., assignors to Phoenix Controls Corporation, Newton, Mass.

Filed May 19, 1988, Ser. No. 196,029

Int. Cl.[4] B08B *15/02*

U.S. Cl. 98—115.3 **38 Claims**



1. In fume hood having an opening for access to the interior thereof and at least two sashes for covering the opening, apparatus for sensing the extent to which the sashes cover the opening comprising:

a source of radiation;

means for detecting said radiation; and

means for mounting said radiation source and said radiation detecting means such that there is relative movement between them as a sash is moved to cover or uncover an opening, the movement between the source and detector being such that the amount of said radiation detected by said detecting means from said source is proportional to the uncovered portion of said opening.

4,893,552

BEVERAGE-MAKING MACHINE

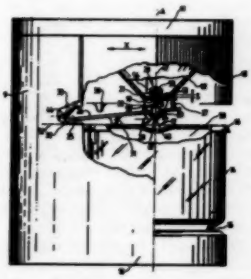
Dieter Wunder, Reichelsheim, and Hans-Jürgen Henning, Königstein, both of Fed. Rep. of Germany, assignors to Braun Aktiengesellschaft, Kronberg, Fed. Rep. of Germany

Filed Dec. 2, 1988, Ser. No. 279,436

Claims priority, application Fed. Rep. of Germany, Dec. 18, 1987, 3743050

Int. Cl.[4] A47J *31/24*

U.S. Cl. 99—299 **19 Claims**



1. A beverage making machine comprising a housing having structure defining a storing receptacle receiving region and support structure above said storing receptacle receiving region,

filter case structure for releasable engagement with said support structure,

said filter case structure having an outlet and an anti-drip valve disposed in said outlet, said anti-drip valve being movable between closed and opened positions,

a valve operating mechanism including biasing means for biasing said valve to its closed position closing said filter case outlet, and one piece lever structure connected between said biasing means and said valve for moving said valve to its open position,

said one piece lever structure being deflectable about a first axis of rotation to a ready position by a stop on the housing as said filter case structure is inserted into said beverage making machine without opening said anti-drip valve, and, only by insertion of said storing receptacle beneath the filter case structure, said lever is deflected by said storing receptacle to move about a second axis of rotation to open said anti-drip valve.

4,893,553

MACHINE FOR THE AUTOMATIC PRODUCTION OF MEAT AND/OR VEGETABLE KEBABS THREADED ONTO SKEWERS

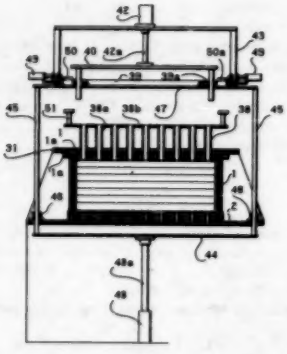
Michel Emsens, Fraisses, France, assignor to Emsens Antoine S.A.R.L., France

Filed Feb. 4, 1988, Ser. No. 152,402

Claims priority, application France, Feb. 4, 1987, 87 01658

Int. Cl.[4] A47J *43/18, 43/00*

U.S. Cl. 99—419 **6 Claims**



1. Machine for the automatic production of layers of meat and/or vegetables threaded onto skewers in which the skewering device is axially positioned, comprising a container (1) having plural,

stacked layers of meat, skewers (20) vertically positioned in vertical holes (1a1) on a top face of a cylinder which acts as a lid (1a) to allow said skewers (20) to rest against the plural layers of meat and/or vegetables; said machine having arrangements taking the skewers (20) that are made up of a plurality of tubes (38) which correspond with perforations in a lid of the container,

the said tubes being fixed at one end into holes made out in the thickness of a coupling plate, which makes up a guiding and positioning assembly for said skewers;

said tubes (38) being of a length that after they are positioned in perforations of the container lid and applied against the layers of meat and/or vegetables, the skewers (20), project a length (x) from the coupling plate; and wherein

said skewering device comprises a horizontal support plate (39) fixed to control means for vertically and simultaneously driving from above, both skewers and tubes

said plate taking a free sliding thrust means, adjustable in function of the length (x) of part projecting from the skewers and to be applied against the plate, said means being controlled by a compression means.

4,893,554

APPARATUS FOR DISTRIBUTING CHEESE COAGULUM IN A VAT

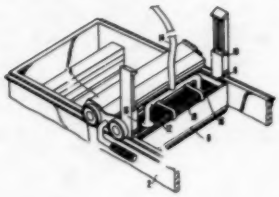
Knud Gashjerg, Silkeborg, Denmark, assignor to Gadan Maskinfabrik A/S, Them, Denmark

Filed Sep. 21, 1988, Ser. No. 249,872

Claims priority, application Denmark, Sep. 21, 1987, 4930/87

Int. Cl.[4] A01J *19/00, 25/00*

U.S. Cl. 99—458 **4 Claims**



1. An apparatus for supplying cheese coagulum to an oblong prepressing vat or similar container, the apparatus comprising a distributor means arranged generally crosswise of a longitudinal direction of the container and being reciprocable along a length of the container, the distributor means including a distributor container having opposed part-cylindrical bottom wall portions, an upper receiving portion, an elongated outlet edge means, and a slot-shaped bottom outlet means, said distributor means being operable to receive a mixture of whey and cheese coagulum from at least one location along a length of the distributor means and to distribute said mixture through the distributor container over the length of the distributor means in such a manner that the mixture may flow off from the distributor container in a broad relatively even flow over a length of the distributor container, rotating wing rollers provided in the distributor for sluicing out said mixture from the at least one receiving location to and beyond the elongated outlet edge means of the distributor container, said wing rollers are mounted so as to engage with each other at an intermediate height level of the distributor container, and wherein said wing rollers are rotatable for sluicing down the mixture along the respective part-cylindrical bottom wall portions of the distributor container just above said slot-shaped bottom outlet means.

4,893,555

HOT FOIL PRINTING

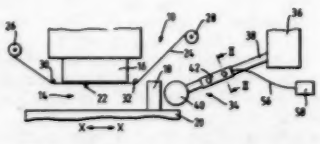
Alan J. Leyland, and Brian C. A. Scorgie, both of Merseyside, England, assignors to Delco Electronics Overseas Corp., Detroit, Mich.

Filed Dec. 16, 1988, Ser. No. 285,685

Claims priority, application United Kingdom, Jan. 12, 1988, 8800596

Int. Cl.[4] B41F *1/07*

U.S. Cl. 101—29 **11 Claims**



1. A hot foil printing apparatus for printing letters or other

devices on a surface of a plastics substrate, the hot foil printing apparatus comprising a workstation comprising a heated die having an outer surface with a print pattern thereon, a printing tape positioned adjacent the outer surface of the heated die and having a printing material thereon on the opposite side of the printing tape to the outer surface of the heated die, and holding means for securing the plastics substrate and for presenting the surface of the plastics substrate to the heated die such that the printing tape can be compressed between the surface of the plastics substrate and the outer surface of the heated die; and transfer means for moving the plastics substrate from a stored position to a second position in which the plastics substrate can be secured by the holding means; characterised in that the transfer means includes heating apparatus in close antecedent proximity to the heated die for heating the surface of the plastics substrate immediately prior to presentation to the heated die, such that the temperature of the surface of the plastics substrate is above room temperature when presented to the heated die.

4,893,556

SCREEN PRINTER WITH DOUBLE DOCTOR/SQUEEGEE, PRINTING PRESSURE SENSOR AND ALIGNING MECHANISM

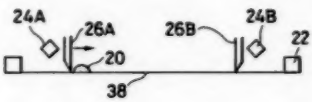
Tetsuo Takahashi; Akio Sasaki; Kunio Mogi; Hajime Shimazaki, and Masakazu Hasegawa, all of Akita, Japan, assignors to TDK Corporation, Japan

Filed Feb. 10, 1988, Ser. No. 155,152

Claims priority, application Japan, Feb. 23, 1987, 62-37899; Feb. 23, 1987, 62-37900; Feb. 25, 1987, 62-40149

Int. Cl.[4] B41F *15/42*

U.S. Cl. 101—123 **11 Claims**



1. A screen printing apparatus comprising:

a screen; and

a pair of printing heads each arranged above said screen so as to be laterally movable with respect to said screen and each including a doctor plate mounted on said printing head and a squeegee vertically movably mounted on said printing head;

said printing heads being alternately actuated for printing;

said doctor plates of said printing heads being arranged laterally opposite to each other on said screen;

said doctor plates each applying a paste onto said screen while transferring said paste;

said squeegees each being moved while pressing said screen against a printed object after application of said paste onto said screen by said doctor plate corresponding thereto.

4,893,557

COUPLING DEVICE FOR AN ADJUSTER WHEEL

Norbert Benthake, Schöppenstedt, and Hans-Jürgen Kusch, Neckargemünd, both of Fed. Rep. of Germany, assignors to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany

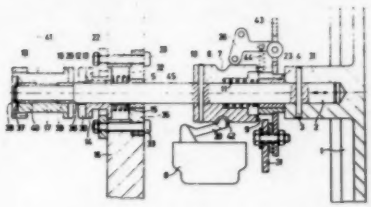
Continuation of Ser. No. 722,995, Apr. 15, 1985, abandoned, which is a continuation of Ser. No. 500,774, Jun. 3, 1983, abandoned. This application Mar. 19, 1986, Ser. No. 841,675

Claims priority, application Fed. Rep. of Germany, Jun. 3, 1982, 3220872

Int. Cl.[4] B41F *13/00*

U.S. Cl. 101—141 **2 Claims**

1. In a printing machine having a drive system including drive gearing, a coupling device for an adjuster wheel manually turnable for starting up printing machine functions, comprising an adjuster wheel shaft having an adjuster wheel at one end thereof and a gear wheel at the other end thereof, said adjuster wheel shaft being adjustably displaceable axially in two stages for bringing the adjuster wheel into and out of operative connection via the gear wheel with the drive gearing of the printing machine, shift means, in response to axial displacement of said adjuster wheel shaft, in one of the two stages, preventing switching on of the drive system for the printing



machine, a clutch device, in response to a further axial displacement of said adjuster wheel shaft, in the other of the two stages operatively connecting the adjuster wheel with the drive gearing of the printing machine, first and second stop means engageable with said shift means and effective after each of said two adjustment stages, respectively, as stage limitation elements for limiting further axial displacement of said adjuster wheel shaft, and means actuable by turning the adjuster wheel for disengaging and overriding said first stop means.

4,893,558

IMAGE REPRODUCTION

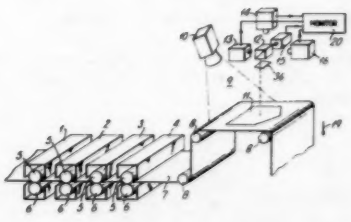
Martin P. Gouch, Hertfordshire, England, assignor to Crosfield Electronics (USA) Limited, London, England

Continuation of Ser. No. 44,263, Apr. 30, 1987, abandoned. This application Dec. 23, 1988, Ser. No. 290,807

Claims priority, application United Kingdom, May 12, 1986, 8611555

Int. Cl.[4] B41F *5/06, 5/16*

U.S. Cl. 101—211 **4 Claims**



1. A method of detecting the positions of features in colour separations, comprising the steps of:

(a) successively printing a plurality of different colour separations on a substrate in superposed relationship, each including a detectable feature, with respective inks, each said ink containing both a visible pigment corresponding to the respective colour of each separation and a respective invisible dye which is detectable only when exposed to radiation outside the visible range, wherein the invisible dyes in each colour separation link individually emit radiation centered on different respective wavelengths;

(b) exposing said printed colour separations to said radiation; and

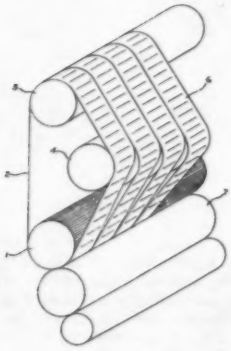
(c) determining the positions of said features in said printed colour separations by individually detecting radiation from said dyes.

4,893,559

METHOD AND APPARATUS FOR PRINTING QUASI RANDOM NUMBER TABLES IN A FLEXOGRAPHIC PRESS

Ian M. Sillars, 2704 The Strand, Manhattan Beach, Calif. 90266

Filed Dec. 16, 1987, Ser. No. 133,666
Int. Cl.[4] B41F *5/18, 5/24*
U.S. Cl. 101—216 **6 Claims**



1. A device for printing quasi random number tables comprising:

a printing plate cylinder, a plurality of continuous belts disposed about said printing plate cylinder, a common idle roller disposed within said belts, said idle roller spaced apart from said printing plate cylinder, a tension roller abutting said belts for providing tension to said belts;

each of said plurality of belts being of different length, each of said belts having gearing means disposed on one side thereof for engagement with said printing plate cylinder and maintaining registration between said belts and said printing plate cylinder, said belts having a plurality of flexographic printing plates disposed on another side thereof at a predetermined pitch;

each of said belts having a length which is a multiple of said predetermined pitch;

each of said printing plates having at least one number disposed thereon so that a plurality of numbers may be printed.

4,893,560

DOCUMENT AND CARD POSITIONING DEVICE FOR ROLLER IMPRINTER

A. Glenn Wright, Route 4, Box 355, Pittsboro, N.C. 27312, and James L. Ross, 1803 Fountain Ridge Road, Chapel Hill, N.C. 27514

Filed Sep. 27, 1988, Ser. No. 249,908
Int. Cl.[4] B41F *3/04*
U.S. Cl. 101—269 **10 Claims**

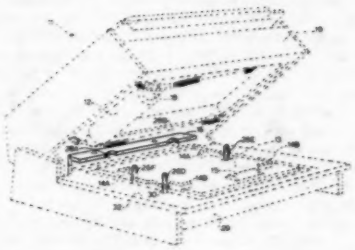
1. In a card and document positioning imprinter device including a roller mechanism movable between an inoperative upper position and lowered printing position over a platen supported by a lower frame piece, the improvement comprising:

(a) a base positioned beneath the platen;

(b) a plurality of pegs extending upward from the base;

(c) a depressible spring means for vertically positioning the base beneath the platen so that the pegs extend upward above the platen; and

(d) a formed piece connected to the base and extending above the platen so that when the roller mechanism is lowered, said roller mechanism strikes the formed piece,



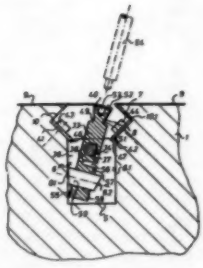
said striking resulting in the base being pushed down on the depressible spring means and the pegs being lowered.

4,893,561

PRINTING PLATE FASTENING AND TENSIONING ASSEMBLY

Heinrich K. Grosshauser, and Georg Schneider, both of Würzberg, Fed. Rep. of Germany, assignors to Koenig & Bauer Aktiengesellschaft, Würzberg, Fed. Rep. of Germany

Division of Ser. No. 76,285, Jul. 22, 1987, Pat. No. 4,848,229. This application Feb. 2, 1989, Ser. No. 305,439
Claims priority, application Fed. Rep. of Germany, Aug. 2, 1986, 3626243
Int. Cl.[4] B41F *27/00*
U.S. Cl. 101—382.1 **6 Claims**



1. A printing plate fastening and tensioning assembly usable to fasten and tension a flexible printing plate on a plate cylinder of a rotary printing machine, said fastening and tensioning assembly comprising:

a movable plate fastening and tensioning element positioned for pivotable movement in an axial groove extending along a surface portion of the plate cylinder, said plate fastening and tensioning element being pivotable in said groove about a central pivot axis which extends along said axial groove between printing plate fastening and tensioning positions in which positions the spacing of an outer portion of said plate fastening and tensioning element with respect to a first edge of said groove is varied;

means on said outer portion of said plate fastening and tensioning element for securing a first end of the printing plate;

a spring lot in said plate fastening and tensioning element for applying a spring force to said plate fastening and tensioning element, said spring force tending to exert a plate tensioning force on said first end of said printing plate;

means to secure a second end of said printing plate to a second edge of said axial groove, and

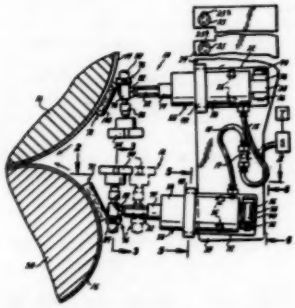
at least a first magnet means carried by an inner end of said plate fastening and tensioning element, said magnet means exerting a magnetic force to magnetically attract said inner end of said plate fastening and tensioning element toward said first edge of said groove when said plate fastening and tensioning element is in said printing plate tensioning position and to magnetically attract said inner end of said plate fastening and tensioning element toward said second edge of said groove when said printing plate fastening and tensioning element is in said printing plate fastening position.

4,893,562

BEARER WIPER ASSEMBLY

Albert W. Robertson, Christopher, Ill., assignor to Air Stamping, Inc., Christopher, Ill.

Continuation of Ser. No. 827,755, Feb. 7, 1986, Pat. No. 4,704,964. This application Nov. 9, 1987, Ser. No. 118,659
The portion of the term of this patent subsequent to Nov. 10, 2001, has been disclaimed.
Int. Cl.[4] B41F *35/02*
U.S. Cl. 101—425 **7 Claims**



1. In a printing apparatus having rotatable bearer members, a bearer wiper assembly comprising:

(a) a support means,

(b) an extensible arm having opposed ends one of said ends being attached to the support means,

(c) a wiper means removably attached to the extensible arm, said wiper means including a wiper pad having a direct bearer-engageable portion provided with a plurality of collection apertures for collecting foreign matter and

(d) the wiper pad being generally ell-shaped having a forward bearer-engageable portion and a rearward mounting portion and means for mounting said mounting portion to the extensible arm.

4,893,563

MONOLITHIC RF/EMI DESENSITIZED ELECTROEXPLOSIVE DEVICE

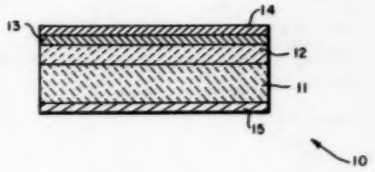
Thomas A. Baginski, Auburn, Ala., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 5, 1988, Ser. No. 280,049
Int. Cl.[4] F42C *19/12*
U.S. Cl. 102—202.2 **24 Claims**

1. A monolithic RF/EMI desensitized electroexplosive device comprising:

a substrate of silicon, coated on a first side with a layer of silicon dioxide; and

a patterned layer of nichrome over said silicon dioxide layer to form a resistive bridgewire; and



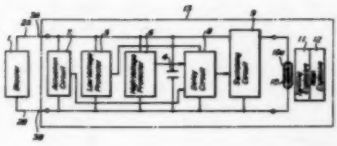
a pattern layer of copper over said nichrome layer said layer of copper forming lead attachment points for the device.

4,893,564

ELECTRIC DETONATOR OF DELAY TYPE

Koji Ochi, Iwamizawa, and Masahide Harada, Sapporo, both of Japan, assignors to Nippon Oil & Fats Co., Ltd., Japan and Harada Electronics Industry, Japan

Filed Oct. 12, 1988, Ser. No. 256,642
Claims priority, application Japan, Oct. 20, 1987, 62-262810
Int. Cl.[4] F42C *11/00*
U.S. Cl. 102—218 **4 Claims**



1. An electric detonator of delay type comprising

a pair of leg wires which are connectable to bus wires connected to a blaster;

a capacitor connected across said leg wires and storing the electric energy supplied from the blaster via the bus wires and the leg wires;

a delay circuit connected to be energized by a terminal voltage generated across said capacitor and generating an igniting signal at a predetermined timing;

a switching circuit connected to be made conductive upon receipt of said igniting signal from said delay circuit and constituting a discharge passage for the electric energy stored in said capacitor;

an igniting resistor connected in said discharge passage and igniting the detonator when the electric energy is discharged through the discharge passage;

a low voltage protection circuit connected across the leg wires and discharging the electric energy stored in the capacitor, when a power supply voltage applied across the leg wires is smaller than the lowest voltage of a normal operation range; and

a high voltage protection circuit connected across the leg wires and discharging said electric energy stored in the capacitor when the power supply voltage exceeds the highest voltage of the normal operation range and supplying to said delay circuit an inhibit signal which inhibits a time counting operation of the delay circuit for determining said predetermined timing.

4,893,565

MOBILE TRACK SWITCH WORKING MACHINE

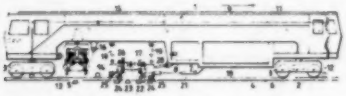
Josef Theurer, Vienna, and Wilhelm Praschl, Linz, both of Austria, assignors to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H., Vienna, Austria

Continuation of Ser. No. 156,416, Feb. 16, 1988, abandoned. This application May 22, 1989, Ser. No. 357,671

Claims priority, application Austria, Feb. 27, 1987, 445/87; Jul. 8, 1987, 1722/87

Int. Cl.[4] E01B *27/17*

U.S. Cl. 104—7.2 15 Claims



1. A mobile track working machine comprising a machine frame mounted for mobility in an operating direction along a track including two rails fastened to ties defining cribs therebetween, each rail having a rail head, a rail foot, a field side and a gage side, and an apparatus for lifting and laterally moving the track in a switch section, the apparatus comprising

(a) a vertically and laterally movable tool carrier frame,

(b) power-actuated drives linking the tool carrier frame to the machine frame for vertically and laterally moving the tool carrier frame with respect to the machine frame,

(c) a pair of flanged wheels supporting the tool carrier frame for mobility on the track,

(1) a respective one of the flanged wheels being associated with each track rail and serving as track lining element,

(d) a rail gripping device associated with each flanged wheel and mounted on the tool carrier frame for engagement with the field side of the associated rail, the rail gripping device including

(1) two rail gripping hooks transversely and vertically adjustable for selective engagement with the head or foot of the associated rail at the field side thereof and spaced from each other in the operating direction a distance corresponding to at least one average crib width, and

(e) independent drives connected to each rail griping hook for independent vertical and lateral adjustment thereof.

4,893,566

GOLF CART SYSTEM

Tomiichi Fukuda, 3-23-18, Denenchofu, Ohta-ku, Tokyo, Japan

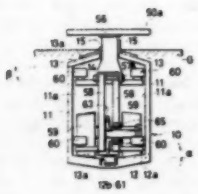
Filed Dec. 9, 1987, Ser. No. 130,631

Claims priority, application Japan, Dec. 11, 1986, 61-295167

The portion of the term of this patent subsequent to Jan. 9, 2004, has been disclaimed.

Int. Cl.[4] B61F *13/00*

U.S. Cl. 104—140 1 Claim



1. A golf cart system comprising:

a track adapted to be embedded in the ground, and

a cart adapted to run on said track,

said track including

a generally horizontally extending bottom wall,

two opposed side walls each generally vertically extending from said bottom wall,

two top walls each extending from an upper end of each side wall toward a center of said track,

a top groove defined between said two top walls, and

a bottom groove defined between inner surfaces of said bottom wall,

said cart including

a base frame,

two supporting posts extending vertically and downwardly from said base frame through said top groove into an interior of said track,

a guiding wheel supporting frame and a driven wheel supporting frame being mounted on a different one of said supporting posts and being movable within said track and movable with respect to each other,

drive means mounted on said base frame,

driving wheels mounted on said driven wheel supporting frame being driven by said drive means from said base frame to run on the inner surfaces of said bottom wall of said track,

first anti-rolling rollers mounted on said guiding wheel supporting frame and said driven wheel supporting frame to run on inner surfaces of said side walls,

second anti-rolling rollers mounted on said guiding wheel supporting frame and said driven wheel supporting frame to run within said bottom groove of said bottom wall,

anti-pitching rollers mounted on said guiding wheel supporting frame and said driven wheel supporting frame to run on inner surfaces of said two top walls, and

guiding wheels mounted on a front end of said guiding wheel supporting frame for guiding said cart along said track.

4,893,567

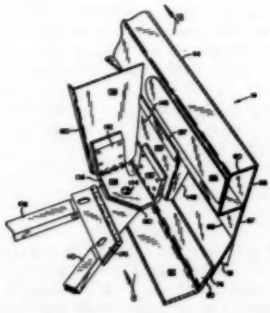
RAILROAD FREIGHT CAR WITH WELL FOR STACKED CARGO CONTAINERS

Charles C. Hill; Thomas Gareth R., both of Del Mar, Calif.; Gary S. Kaleta, Warren, and Gregory J. Saxton, Portland, both of Oreg., assignors to Gunderson, Inc., Portland, Oreg.

Filed Aug. 18, 1988, Ser. No. 234,332

Int. Cl.[4] B61D *17/08*

U.S. Cl. 105—419 16 Claims



1. A container support assembly for use in a railroad freight car including a pair of side sills defining a well for receiving and carrying intermodal cargo containers and other loads concentrated at separate discrete locations rather than being spread uniformly over large areas, said container support assembly comprising:

(a) a main load support member of high strength steel plate

bent to include a horizontal load-supporting foot portion and at least one upwardly directed leg portion;

(b) an attachment hanger bracket assembly of thinner metal plate members welded together and adapted to fit against and be welded to one of said side sills; and

(c) a plurality of mechanical fasteners attaching a respective one of said upwardly directed leg portions to said hanger bracket assembly.

4,893,568

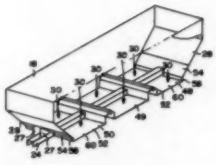
RAILWAY CAR CONVERSION TO GONDOLA

Norman S. Adams, Cincinnati, Ohio, assignor to Trinity Industries, Inc., Dallas, Tex.

Filed Dec. 7, 1987, Ser. No. 129,799

Int. Cl.[4] B61D *17/10*

U.S. Cl. 105—416 **13 Claims**



1. A railway car comprising:

a generally longitudinally extending center sill and laterally spaced pair of side walls;

said side walls each including a side sill;

a crossbearer structure positioned above said center sill and extending between the side walls;

a floor extending between the side walls and being connected with the crossbearer structure in a manner that substantially covers the cross bearer structure; and

a floor frame structure connected with the side sills and extending below and engaging the floor for supporting and rigidifying the floor,

said floor frame structure comprising substantially straight support members extending from one side wall to the other side wall transversely of the center sill, beneath said floor and center sill and in engagement therewith along a substantially flat surface.

4,893,569

SAFETY WALL AND A SAFETY CAGE FOR TIRE INFLATION

Arne H. Hansen, Virringvej 2, DK-8660 Skanderborg, Denmark

Continuation of Ser. No. 56,656, Jun. 2, 1987, abandoned. This application Jun. 14, 1988, Ser. No. 206,492

Int. Cl.[4] E05G *3/00*; E06B *9/00*

U.S. Cl. 109—1 S **4 Claims**

1. A safety wall structure for separating a tire inflation area from an adjacent area, the safety wall structure including at least two substantially parallelly arranged wall portions made of a net material of a type having mesh strip portions with substantially planar surfaces twisted out from a plane of the respective wall portions so as to be oblique relative thereto and form an open-mesh net, the wall portion as being arranged with a mutual spacing of at least 1 cm and with opposed mesh stripped portions being oblique in mutually opposite directions with respect to the planes of the wall portions so as to cause a double change in direction of an air flow of an exploding tire thereby preventing a discharge of strong air pressure waves, and wherein mesh junctions of one of the wall portions are staggered with respect mesh junctions of the other wall portions.

4,893,570

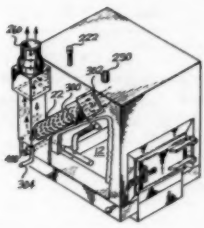
COMBUSTION FURNACE

Robert J. Boucher, P.O. Box 985, Bonner, Mont. 59823

Division of Ser. No. 32,972, Apr. 2, 1987, Pat. No. 4,829,914, which is a continuation of Ser. No. 672,132, Nov. 16, 1984, abandoned. This application Nov. 28, 1988, Ser. No. 276,883

Int. Cl.[4] F23J *15/00*

U.S. Cl. 110—203 **15 Claims**



1. A solid fuel combustion furnace comprising:

a solid fuel combustion chamber formed as a six-sided enclosure having a trapezoidal cross section with the forward wall being shorter than the rear wall and the top section sloping upwardly from front to rear, said top section being provided with a gas exhaust port proximate said rear wall; and

a gas combustion chamber for combusting the gas flow produced by combustion of the solid fuel in the solid fuel combustion chamber, the gas combustion chamber formed as a six-sided enclosure having an inverted, generally trapezoidal cross section with the rear wall being shorter than the forward wall and the bottom section sloping upwardly from front to rear, said bottom section being parallel to the top section of said solid fuel combustion chamber, said gas combustion chamber bottom section being provided with a gas intake port proximate to the exhaust port of said combustion chamber for receiving said gas flow, the top section of said gas combustion chamber being provided with an exhaust port proximate the forward wall of said gas combustion chamber for venting said gas flow,

whereby the expanding shape of the gas combustion chamber produces gas flow turbulence to thereby promote combustion.

4,893,571

METHOD AND DEVICE FOR PLANTING BALLED SEEDLINGS

Reijo Hilkiä, Iso-Vimma; Leo Lehto, and Esa Lehto, both of Kiyttö, all of Finland, assignors to Lännen Tehtaat Oy, Finland

Filed Jul. 26, 1988, Ser. No. 224,328

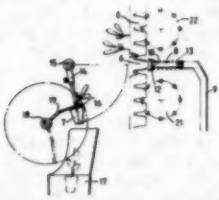
Claims priority, application Finland, Nov. 2, 1987, 874803

Int. Cl.[4] A01C *11/02*

U.S. Cl. 111—105 **11 Claims**

1. A method of planting balled seedlings taken from a con-

tainer tray having a top and a bottom, wherein each balled seedling is taken hold of and removed from the container through the top, the improvement comprising taking hold of the balled seedling and removing it from the container by



means of a spike-like element by pushing the seedling from the bottom into the spike-like element, which remains in a substantially horizontal position during the pushing operation, and subsequently releasing the seedling by rotating the spike-like element into a substantially vertical position.

4,893,572

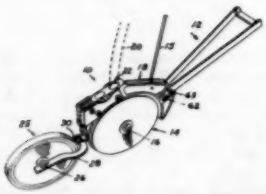
GRAIN DRILL PLANTING DEPTH CONTROL

Michael J. Schaefer, P.O. Box 544, Okarche, Okla. 73762

Filed Sep. 12, 1988, Ser. No. 242,586

Int. Cl.[4] A01C *5/06*

U.S. Cl. 111—194 **1 Claim**



1. An attachment for use with an agriculture seeding implement having a seed planting apparatus comprising a pair of furrow opening disks substantially aligned with respect to the intended direction of travel in a seed planting action of the implement and having a superposed disk support journalling the disks and connected in rearward longitudinal trailing fashion with the implement by a pair struts, comprising: a pressure wheel disposed rearwardly of and in substantial

alignment with said pair of disks;

means including a pressure arm for journalling said wheel;

telescoping tongue and bracket means connecting said arm with the disk support for vertically positioning said wheel relative to said disks and limiting the earth penetrating action of said disks to a predetermined depth,

said telescoping tongue and bracket means including a U-shaped bracket having generally parallel legs straddling and connected with opposing sides of said support and having a generally vertically disposed bight portion disposed rearwardly of the support,

said telescoping tongue and bracket means further including a generally vertically disposed tongue secured at its depending end with the end of said pressure arm opposite the pressure wheel in vertically slidable contact and with bight portion,

said bight portion and said tongue each having a series of vertically spaced bolt receiving openings,

said pair of struts being bolted to the forwardly projecting portion of said support; and,

a strut link interposed between and connecting said support with said pair of struts,

said link having an arcuate slot permitting a selected angular attitude of said seed planting apparatus with respect to said struts and the surface of the earth.

4,893,573

OVERLOCK SEWING MACHINE

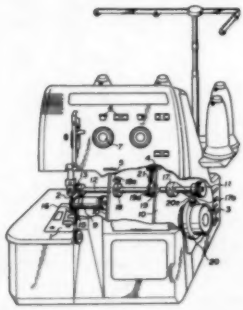
Akira Moriya, Tendo, Japan, assignor to Suzuki Manufacturing Co., Ltd., Japan

Filed May 22, 1989, Ser. No. 354,833

Claims priority, application Japan, Oct. 14, 1988, 63-259205

Int. Cl.[4] D05B *87/02*

U.S. Cl. 112—225 **2 Claims**



1. An overlock sewing machine comprising a needle vertically moving while passing through a needle plate, a knife for cutting a marginal portion of a cloth at a side of said needle plate, and a looper for hemstitching the marginal portion thus cut of the cloth in cooperation with said needle,

and a threading unit comprising a shaft disposed crosswisely to the feed direction of the cloth, a threading member fixed on said shaft and swingable in the rear of said knife, a thread setting hook fixed on said threading member and retractably passable through the eye of said needle, and a knob for rotating said shaft.

4,893,574

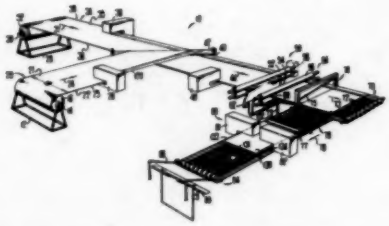
METHOD FOR MANUFACTURING PILLOWCASES

Darrell D. O'Neal, 2081 Merle Dr., Conyers, Ga. 30207, and Parks C. Stewart, 1005 Winding Creek Trail, Atlanta, Ga. 30328

Division of Ser. No. 233,466, Aug. 18, 1988, Pat. No. 4,856,439. This application Jun. 8, 1989, Ser. No. 364,258

Int. Cl.[4] D05B *97/00*

U.S. Cl. 112—262.2 **8 Claims**



1. A method of constructing a pillowcase or the like, comprising the steps of:

conveying an upper layer of fabric having obverse and

reverse surfaces and being of indeterminate length along a first predetermined path with its obverse surface facing upwardly;

forming a first cuff along a first lateral edge of said upper layer of fabric;

stitching said first cuff to said first lateral edge of said upper layer of fabric;

conveying a lower layer of fabric having obverse and reverse surfaces and being of indeterminate length along a second predetermined path with its obverse surface facing upwardly;

forming a second cuff along a first lateral edge of said lower layer of fabric;

stitching said second cuff to said first lateral edge of said lower layer of fabric;

reversing said upper layer of fabric so that its obverse surface faces downwardly;

bringing said upper and lower layers of fabric together with their obverse sides mutually facing and their first cuffed lateral edges mutually corresponding;

conveying said mutually facing upper and lower layers of fabric together along a third predetermined path;

stitching said upper and lower layers of fabric together along the second lateral edges of said layers of fabric opposite said first cuffed lateral edges;

measuring said indeterminate length upper and lower layers of fabric to a predetermined length substantially equal to the desired width of a finished pillowcase;

cutting said upper and lower layers of fabric perpendicular to said first and second lateral edges at said predetermined length to form a rectangular unitary workpiece comprising upper and lower panels of fabric having obverse surfaces in mutually facing superposition, said panels being stitched together along one transverse edge and cuffed at their opposite transverse edge, and the remaining two edges of said rectangular unitary workpiece comprising longitudinal edges;

conveying said rectangular unitary workpiece along a path parallel to said longitudinal edges of said rectangular unitary workpiece; and

stitching said upper and lower panels of said rectangular unitary workpiece together along said longitudinal edges of said rectangular unitary workpiece, whereby said rectangular unitary workpiece is stitched closed along both longitudinal edges and one transverse edge and is open at the opposite cuffed transverse edge.

4,893,575

FANCY SEAM SEWING MACHINE WITH AN INFINITELY VARIABLE ZIGZAG MODULE

Karl I. F. Rendahl, Huskvarna, Sweden, assignor to Husqvarna Aktiebolag, Huskvarna, Sweden

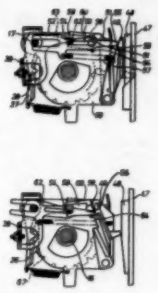
Filed May 12, 1988, Ser. No. 193,402

Claims priority, application Sweden, May 25, 1987, 8702192

Int. Cl.[4] D05B *3/02*

U.S. Cl. 112—465 **3 Claims**

1. In a fancy seam sewing machine with a zigzag control arrangement for producing fancy seams, said machine having a cam disk unit (30) rotatable with a driving shaft provided in the machine, an elastic member (34) influenced cam selecting unit (33) which, by means of a pattern selection control device (20) is adjustable relative to the cam disk unit and connectable to cam disks in said cam disk unit as well as connected to a guide (58) journalled in the control device for carrying out an oscillatory movement effected by one of said cam disks, and a sensor (51) included in the control device and cooperating with the guide and journalled in bearings for oscillatory and sliding movements and connected to a needle bar unit (10) of the machine, the improvement wherein the sensor comprises a slide with extension and displaceability within the same plane as said oscillatory movement of the guide and continuously adjustable in its longitudinal direction by means of a zigzag control (47) on any position relative to the guide to transfer an



arbitrary amplitude of said oscillatory movement to the slide and therefrom to the needle bar unit.

4,893,576

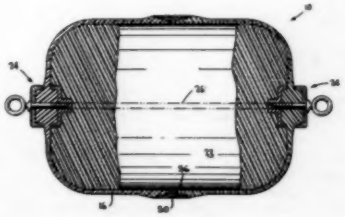
MARINE FENDER

John T. Day, Winfield; Robert O. Herder, Easton, and Robert B. McNatt, Annapolis, all of Md., assignors to Rubber Millers, Inc., Baltimore, Md.

Continuation of Ser. No. 467,241, Feb. 17, 1983, Pat. No. 4,628,850, which is a continuation-in-part of Ser. No. 352,255, Feb. 25, 1982, abandoned. This application Dec. 12, 1986, Ser. No. 941,149

Int. Cl.[4] B63B *59/02*

U.S. Cl. 114—219 **9 Claims**



1. A fender for marine use comprising a unitary elastomeric shell having two ends and a cavity at each end thereof, said unitary shell having been formed by joining two sections each having one of said two ends and said cavity being less than about 25 percent of the diameter of said shell; mooring fittings fitted onto each of said cavities and interconnected, and contained within said shell a solid, flexible foam bun, said bun having a diameter substantially as great as the internal diameter of said shell and a length substantially as great as the internal length of said shell, said shell including a thickened area where said shell sections are joined substantially equal distance from each of said ends.

4,893,577

TOW ROPE PYLON WITH ROTATABLE BUSHING

Michael D. Jennings, Maryville, Tenn., assignor to Mastercraft Boat Co., Maryville, Tenn.

Filed May 18, 1988, Ser. No. 195,589

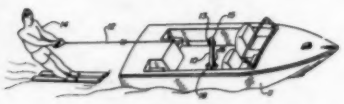
Int. Cl.[4] B63B *21/04*

U.S. Cl. 114—253 **6 Claims**

1. A pylon for a tow rope comprising:

a base having upper and lower ends for mounting the pylon on a support structure,

a bushing rotatably mounted on the upper end of the base, the bushing having a tubular central portion and radially enlarged upper and lower ends for restraining movement of a tow rope off of the tubular central portion,



said base including an elongated body portion, a transversely enlarged support flange adjacent the upper end of the base for supporting the bushing, and a rod portion which extends through the tubular central portion of the bushing.

4,893,578

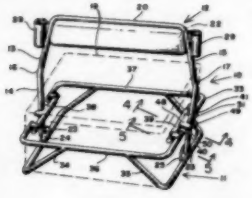
COMBINATION LEANING BAR AND SUPPORT STRUCTURE FOR A BOAT SEAT

Richard E. Doerfer, Cape Coral, and William B. Nesbitt, Fort Lauderdale, both of Fla., assignors to Aquasport Marine Industries, Inc., Hialeah, Fla.

Filed Aug. 22, 1988, Ser. No. 235,012

Int. Cl.[4] B63B *17/00*

U.S. Cl. 114—363 **8 Claims**



1. Combination leaning bar apparatus and support structure apparatus for a boat seat comprising

a boat seat support structure comprising

a substantially rectangularly shaped tubular frame with legs attached thereto and extending downward therefrom, said substantially rectangularly shaped tubular frame comprising

a forward U-shaped member, an aft U-shaped member arranged in a plane with a space between the ends of the U-shaped members, a side bar attached to adjacent ends of said U-shaped members and offset so as to maintain the space between the ends of the U-shaped members,

a leaning bar assembly pivotally attached to said boat seat support structure, said leaning bar assembly having vertical side members respectively fitting within said spaces,

locking means for locking said leaning bar assembly in a forward position, an aft position and an intermediate position therebetween.

4,893,579

COMPACT PLANING TYPE BOAT

Noboru Kobayashi, Iwata, Japan, assignor to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan

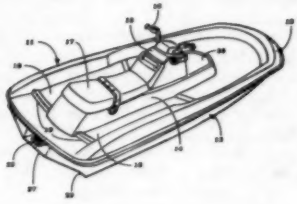
Filed Aug. 26, 1988, Ser. No. 237,505

Claims priority, application Japan, Aug. 28, 1987, 62-213010

Int. Cl.[4] B63B *35/86*

U.S. Cl. 114—363 **7 Claims**

1. A hull configuration for a watercraft having a bow portion, an intermediate bridge portion, supporting means for steering said watercraft, and a stern portion, a rear seat for seating at least two riders in said stern portion in straddle, tandem relationship to the rear of said bridge portion so that the forwardmost rider may steer said watercraft, and a forward seat for one of said riders in said bow portion forwardly of said bridge portion, a depressed foot area around a front portion and side portions of said forward seat and side portions of the rear seat and said bridge portion for placement of the riders feet, the unladen center of gravity of said hull being juxtaposed



in a longitudinal direction in proximity to said bridge, said hull being configured such that said hull assumes a generally upwardly inclined position when riders are seated in tandem on said rear seat and said hull is travelling forwardly at speed and in a substantially horizontal condition when said watercraft is not travelling and riders of approximately equal weight are seated respectively on said forward and rear seats at approximately equal distances from said bridge.

4,893,580

SCUBA WHISTLE

Alan W. Joseph, Jr., 302 Washington Ave., Mount Vernon, Ind. 47620, and Timothy E. Joseph, 540 Kellon Ave., Los Angeles, Calif. 90021

Division of Ser. No. 40,161, Apr. 20, 1987, Pat. No. 4,852,510. This application May 15, 1989, Ser. No. 352,009

Int. Cl.[4] G10K *5/00*; B06B *3/00*

U.S. Cl. 116—137 R **5 Claims**

1. An underwater whistle adapted to be coupled with a pressure hose leading from a pressure regulator mounted on the scuba diver's pressurized tank and regulating air pressure to a predetermined pressure, said whistle comprising:

an elongate housing tube formed with a resonant chamber therein, said resonant chamber having inlet and outlet bosses, said inlet and outlet bosses each being formed with internal screw threads;

an elongate reed plate disposed within said resonant chamber projecting from said inlet boss to said outlet boss and formed medially with a sound generating orifice;

inlet and outlet fittings formed with external screw threads screwed into said inlet and outlet bosses, respectively, and configured with respective inlet and outlet ports;

inlet and outlet plug means interposed between said respective inlet fitting and reed plate and said outlet fitting and reed plate and configured to direct air from said inlet fitting to one side of said orifice and from the other side of said orifice to said outlet fitting;

inlet coupling means for coupling said pressure hose leading from said pressure regulator to said inlet fitting; and

a control valve for controlling air flow from said outlet fitting, whereby a diver may controllably open said con-

trol valve to communicate air supplied by said pressure hose to said resonant chamber and through said orifice to cause said reed plate to vibrate and generate an audible sound vibration.

4,893,581

IMAGE FORMING METHOD

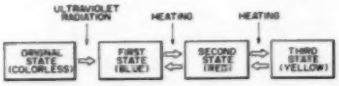
Hiroshi Matsuda, Yokohama, and Toshihiko Miyazaki, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 157,142, Feb. 10, 1988, abandoned, which is a continuation of Ser. No. 812,067, Dec. 23, 1985, abandoned. This application Nov. 14, 1988, Ser. No. 273,137

Claims priority, application Japan, Dec. 28, 1984, 59-274828; Dec. 28, 1984, 59-274829

Int. Cl.[4] B41M *5/26*

U.S. Cl. 116—201 **9 Claims**



1. An image-forming method comprising imparting thermal energy to a medium in a first state to thereby change said medium to either a second state or a third state, wherein said change from said first state to said second state is reversible, said change from said first state to said third state is irreversible, and said medium in said third state is capable of being reversibly changed to said second state; said medium in a first state being a polymerized Langmuir-Blodgette monomolecular film or built-up monomolecular film of a diacetylene derivative compound represented by the formula

$$R_1—C{\equiv}C—C{\equiv}C—R_2—X$$

wherein X is selected from the group consisting of carboxyl groups, hydroxyl groups, amino groups, nitrile groups, thioalcohol groups, imino groups, sulfonic acid groups, derivatives of sulfonic acid groups, salts of sulfonic acid groups, sulfinic acid groups, derivatives of sulfinic acid groups, and salts of sulfinic acid groups; R_1 and R_2 are each selected from the group consisting of alkyl groups, olefinic hydrocarbon groups, aryl groups, alkylene groups, and alkenylene groups.

4,893,582

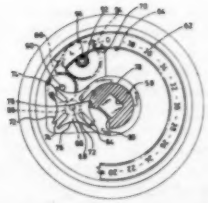
DECK BOX VALVE OPERATOR AND POSITION INDICATOR ASSEMBLY

Bruce P. Kalamon, and David P. Yanusko, both of Pottstown, Pa., assignors to Teleflex Incorporated, Limerick, Pa.

Filed Nov. 19, 1986, Ser. No. 932,693

Int. Cl.[4] F16K *37/00*

U.S. Cl. 116—277 **11 Claims**



1. A deck box valve operator and position indicator assembly (10) comprising; housing means (18) for mounting to a support structure (16), spindle means (46) rotatably supported in said housing means (18) said housing means including means for reading said ring means (62), said spindle means (46) having a lower end (56) for connection to the operating shaft (14) of a valve (12), said spindle means (46) having an upper end (58) for receiving a tool for rotating said spindle means (46), ring means (62) rotatably supported in said housing means (18) for indicating the position of the valve (12) between open and shut positions, and transmission means operatively interconnecting said spindle means (46) and said ring means (62) for rotating said ring means in proportion to the rotation of said spindle means (46), said transmission means being characterized by a sprocket (66) supported by said housing means (18) for rotation about a sprocket axis (68) adjacent said spindle means (46), said sprocket (66) having a plurality of radial arms (72) having slots (74) extending thereinto from the distal ends thereof, said sprocket (66) having arcuate peripheries (76) extending between adjacent arms (72), said spindle means (46) having a circular circumference (78) interrupted by a concave recess (80) axially aligned with said sprocket (66), said arcuate peripheries (76) between said arms (72) of said sprocket (66) being complementing to said circular circumference (78) of said spindle means (46), said concave recess (80) being concentric to said axis (68) of said sprocket (66) when radially aligned therewith, said arms (72) of said sprocket (66) extending into said concave recess (80) when radially aligned therewith, a coaxial pin (84) supported by said spindle means (46) radially outside of said circular circumference (78) thereof and on the radial center of said concave recess (80) so that said sprocket (66) is prevented from rotating by an arcuate periphery (76) complimentary said circular circumference (78) of said spindle means (46) with the adjacent arms (72) extending about said circular circumference (78) until said spindle means (46) is rotated sufficiently to slide said pin (84) into the slot (74) of one of said arms (72) to rotate said sprocket (66) as the pin-engaged arm (72) rotates through said concave recess (80) where the next adjacent arcuate periphery (76) compliments the approaching circular circumference (78) of said spindle means (46) and said pin (84) slides radially out of engagement with the pin-engaged arm (72).

4,893,583

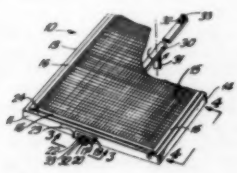
STRETCHER MEANS FOR USE IN A SPIN ART MACHINE

David Jaffa, Franklin Lakes, N.J., assignor to Artwave America, Inc., Hawthorne, N.J.

Continuation of Ser. No. 106,450, Oct. 8, 1987, abandoned. This application Mar. 31, 1989, Ser. No. 332,447

Int. Cl.[4] B05B *13/02;* **B05C** *11/08*

U.S. Cl. 118—52 **19 Claims**



1. A stretcher for use in a spin art machine in which a rotating carrier member engages the stretcher and spins the stretcher about a spin axis so as to spread over the surface of a fabric mounted on the stretcher, under the action of centrifugal force, a liquid coloring agent that has been applied to said fabric surface, said stretcher comprising in combination:

an expanse of resilient material adapted to absorb pressure applied at the point of application of the coloring agent, thereby promoting smooth, continuous application thereof;

means suspending said resilient material for supportingly engaging the undersurface of a section of said fabric

whose outer surface is to receive said coloring agent, said means including means for maintaining out of engagement with said resilient material any portion of said fabric that extends around and behind said expense of material, said suspending means comprising a perimetric frame suspending said resilient material substantially in a plane; and

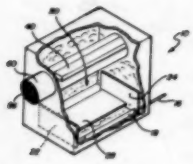
means for enabling a rotatable carrier to engage said resilient material suspending means at opposite ends thereof along a selectable one of a group of parallel straight lines so that said stretcher may be spun about a selectable axis normal to the plane of said resilient material, said axis passing through the mid-point of the selected line.

4,893,584

LARGE AREA MICROWAVE PLASMA APPARATUS

Joachim Doehler, Union Lake, and Jeffrey M. Krisko, Highland, both of Mich., assignors to Energy Conversion Devices, Inc., Troy, Mich.

Filed Mar. 29, 1988, Ser. No. 174,659
Int. Cl.[4] C23C *16/48*
U.S. Cl. 118—723 **54 Claims**



1. Microwave energy apparatus for sustaining a substantially uniform plasma over a relatively large area, comprising:

a vacuum vessel for initiating and sustaining a plasma in a plasma region thereof;

means in said vessel for supporting substrate means in operative juxtaposition relative to the plasma region;

means for maintaining said vessel at a desired, relatively low substantially sub-atmospheric pressure;

means for introducing process gases into said vessel;

non-evanescent applicator means at least partially extending into the interior of said vessel, said applicator means adapted to substantially uniformly radiate microwave energy from a source into the interior of said vessel for sustaining a plasma from the process gases introduced thereinto;

means for isolating the microwave radiating applicator means from the plasma region; said isolating means (1) formed from a material through which microwave energy can be radiated from said applicator means into said vessel, and (2) configured in a shape substantially optimized to withstand pressure differentials, whereby the thickness of the isolating means may be minimized and the microwave radiating applicator means and the isolating means are adapted to perform a substantially uniform plasma operation along an elongated surface of substrate means disposed in said vessel.

4,893,585

ZEOLITES IN POULTRY HATCHING

Sebastian M. Laurent, Greenwell Springs, La., assignor to Ethyl Corporation, Richmond, Va.

Continuation-in-part of Ser. No. 927,373, Nov. 6, 1986, abandoned. This application Nov. 27, 1987, Ser. No. 123,281
Int. Cl.[4] A01K *45/00*
U.S. Cl. 119—1 **14 Claims**

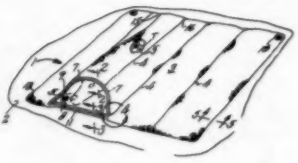
1. A method of improving the hatching parameters of poultry eggs which comprises incubating the egg for about one day at about 100° F., placing the warm incubated egg in a water suspension of zeolite wherein the temperature of the suspension is from about 1.5° F. to about 30° F. lower than the temperature of the egg just prior to being placed therein, soaking the egg in such solution, and thereafter incubating the egg to cause hatching of a poultry chick to occur.

4,893,586

SLEEPING BAG FOR PETS

Betty J. Carson, P.O. Box 989, Canyonville, Oreg. 97417

Filed May 26, 1988, Ser. No. 199,140
Int. Cl.[4] A01K *1/035*
U.S. Cl. 119—1 **1 Claim**



1. A sleeping bag for household pets, said sleeping bag comprising,

a fabric top member and a fabric bottom member having generally corresponding perimetrical edges, said top member being of quilted construction,

stitching extending along the perimetrical edges to join the top and bottom members,

spaced apart top and bottom segments of said perimetrical edges defining an opening for ingress and egress of a pet with the top segment having a rolled and stitched edge to provide a degree of rigidity to same to provide an arch, and

said top member being folded at intervals along one of said edges to provide pleats in the top member contributing to the formation of tunnel extending substantially the length of the top member and accessible through said arch into which the pet may crawl.

4,893,587

URINE COLLECTION DEVICE

Aubrey Bailey, Jr., 3341 South 42nd, Omaha, Nebr. 68506

Filed Sep. 22, 1988, Ser. No. 247,726
Int. Cl.[4] A01K *23/00*
U.S. Cl. 119—95 **7 Claims**

1. In combination:

a horse blanket draped over a female horse;

said horse blanket having a rearward edge with first and second spaced-apart vertical portions located on opposite sides of the horse's vulva; and

a urine collection device detachably secured between said first and second vertical portions of said horse blanket adjacent to the horse's vulva;

said collection device comprising:

bag means detachably mounted to a framework of flexible straps;

said strap framework being selectively and adjustably secured between said vertical portions of said blanket adjacent to said vulva so as to permit said bag means to collect a urine sample;

said bag means having a back portion and a front portion and being sealed along a lower edge and two side edges to form a container open at the upper edge of said front portion;

said back portion extending a greater length than said

front portion to form a deflection flap extending upwardly beyond the upper edge of said front portion;

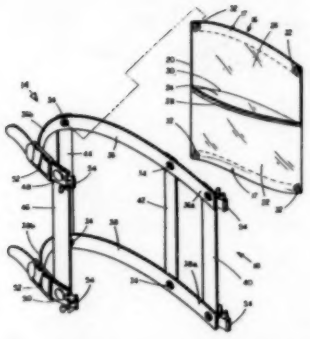
said strap framework including upper and lower horizontally-oriented straps;

means for removably securing said bag means to said strap framework, comprising:

first coacting fastener means having a first half secured to the upper edge of said flap and a second half secured to said upper horizontal strap; and

second coacting fastener means having a first half secured to the lower edge of said bag means and a second half secured to said lower horizontal strap;

said bag means being removably secured to said strap framework with said front portion upper edge located parallel to, and generally midway between, said horizontal straps;



each end of said upper and lower straps having clamping means connected thereto for removably securing said strap framework to a blanket on said horse;

said upper strap being removably secured between said vertical portions and extending horizontally above the vulva and below the anus of the horse;

said lower strap being removably secured between said vertical portions and extending horizontally below the horse's vulva;

said strap framework being secured to said blanket to locate the upper edge of said front portion slightly below and adjacent to the horse's vulva with said flap extending upwardly therefrom to said upper strap, said flap located to deflect horse feces away from said container and thereby permit collection of a urine sample free from contamination.

4,893,588

ADAPTIVE CONTROL TECHNIQUE FOR STEAM GENERATOR CLEANING

Jiri Jekerle, Baunatal Altenritte, and Jean-Claude Heis, Niddatal, both of Fed. Rep. of Germany, assignors to Schmidt'sche Heissdampf GmbH, Kassel-Bettenhausen, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 263,176, Oct. 27, 1988. This application Jul. 7, 1989, Ser. No. 376,689

Claims priority, application Fed. Rep. of Germany, Oct. 29, 1987, 3736668; Oct. 28, 1988, 3836707

Int. Cl.[4] F22B *37/18, 37/48*

U.S. Cl. 122—379 **7 Claims**

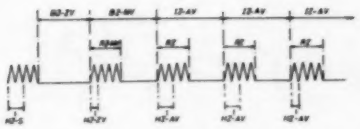
1. An adaptive control method for the cleaning of a heat exchange surface of a steam generator by means of causing vibration thereof, the vibration being produced by an actuator which is driven with a constant force, the actuator being mechanically coupled to the surface to be cleaned, the method comprising the steps of:

measuring the number of vibrations of the surface resulting from operation of the actuator with the surface in a clean state;

measuring the operational time of the steam generator in which the surface reaches the permissible level of dirt accumulation;

measuring the number of vibrations of the surface resulting from operation of the actuator with the permissible level of dirt accumulation on the surface,

cleaning the heating surface by causing vibration thereof for a first period of time;



operating the steam generator for a further period of time and then again causing vibration thereof for the said first time period and measuring the number of vibrations which occur in a short time period;

comparing the measured numbers of vibrations and calculating a parameter of the vibrational cleaning cycle as a function of the ratio of at least the last two measured numbers of vibrations; and

continually repeat the measuring and calculating during the operation of the steam generator.

4,893,589

WATER COOLING SYSTEM FOR A SUPERCHARGED INTERNAL-COMBUSTION ENGINE

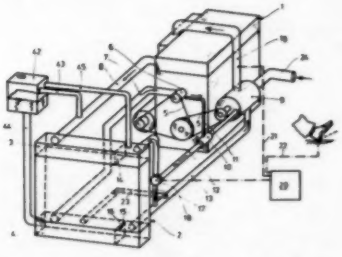
Fritz Spinnler, Arisdorf, Switzerland, assignor to BBC Brown Boveri AG, Baden, Switzerland

Filed Jul. 14, 1988, Ser. No. 218,909

Claims priority, application Switzerland, Aug. 3, 1987, 2964/87

Int. Cl.[4] F01P *1/06*

U.S. Cl. 123—41.31 **12 Claims**



1. A water cooling system for an internal-combustion engine supercharged by means of a mechanical supercharger, comprising:

a main cooling circuit including a water pump, a radiator, and an internal-combustion engine;

said radiator including a compartmentalized part;

a secondary cooling circuit for the supercharger, which secondary cooling circuit is operated with the same working medium of the main cooling circuit;

means for driving the working medium in the secondary cooling circuit, which working medium in the secondary cooling circuit is fed from the main cooling circuit;

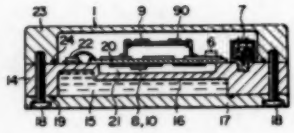
whereby said working medium in the secondary cooling circuit is cooled in the compartmentalized part of the radiator.

4,893,590

AUTOMOTIVE LIQUID-COOLED ELECTRONIC CONTROL APPARATUS

Yuichi Kushimura; Shinobiu Watanabe, both of Katsuta, and Seiji Suda, Mito, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 28, 1988, Ser. No. 250,064
Claims priority, application Japan, Sep. 30, 1987, 62-243747
Int. Cl.[4] F01P 1/06
U.S. Cl. 123—41.31 10 Claims



1. An electronic control apparatus for use in an automobile, comprising:

(a) a base having a passage defined therein for circulation of an engine cooling water and semiconductor devices disposed on a side of said base, said base being made of a material having a good thermal conductivity; and

(b) an enclosure fixed to said side of said base to hermetically cover said semiconductor devices;

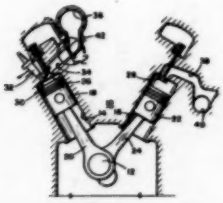
wherein a flow control valve is disposed at an inlet side of said passage, said flow control valve being arranged to open when a temperature of said engine cooling water has reached a predetermined temperature.

4,893,591

MANIFOLD FLAME ARRESTOR

Kevin G. Nelson, Tulsa, Okla., assignor to Facet Enterprises, Inc., Tulsa, Okla.

Filed Sep. 22, 1988, Ser. No. 247,739
Int. Cl.[4] F02B 75/18
U.S. Cl. 123—52 MF 2 Claims



1. With an internal combustion engine having a plurality of cylinders, each cylinder having an intake valve and a means of ignition of combustible mixtures drawn into the cylinder through the intake valve, and an intake manifold communicating with the intake valves of the plurality of cylinders, a system of reducing the possibility of the transmission of combustion producing flame from within a cylinder into the intake manifold, comprising:

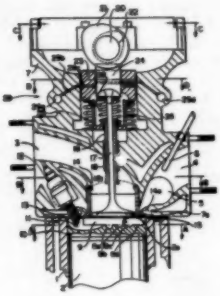
a flame arrestor member sealably positioned in the path between the intake manifold and each intake valve, each flame arrestor member permitting bidirectional passage of combustible mixtures but prohibiting the passage of flame therethrough.

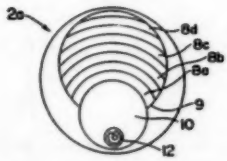
4,893,592

COMBUSTION CHAMBER FOR AN INTERNAL COMBUSTION ENGINE

Avelino Falero, P.O. Box 2590, Juncos, P.R. 00666

Filed Nov. 7, 1988, Ser. No. 268,276
Int. Cl.[4] F01L 1/28
U.S. Cl. 123—79 C 17 Claims





1. In an internal combustion engine, an arrangement for providing controlled combustion in a combustion chamber thereof, comprising:

a cylinder and piston guided in said cylinder;

a combustion chamber delimited laterally by the cylindrical walls of said cylinder, delimited at a lower end by a face of said piston and delimited in part at an upper end by valve means for allowing the controlled admission of an air-fuel charge into said combustion chamber and subsequent exhaust of combustion gases therefrom,

said valve means comprising co-axially aligned exhaust and intake valve mechanisms actuated by camming means,

said piston face comprising a shallow bowl for accommodating therein the spark gap of a spark plug when the piston is at top dead center, and a plurality of arcuately shaped grooves situated at least partially about said shallow bowl.

4,893,593

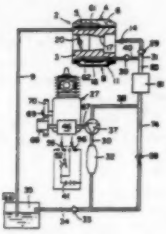
START-FUEL SUPPLY DEVICE IN INTERNAL COMBUSTION ENGINE FOR PORTABLE EQUIPMENT

Yoshimi Sejimo, Urayasu; Kohji Nagaoka, Kawasaki, and Takeshi Kobayashi, Yokohama, all of Japan, assignors to Walbro Far East, Inc., Kawasaki, Japan

Filed Nov. 21, 1988, Ser. No. 273,891
Claims priority, application Japan, Jan. 18, 1988, 63-8187
Int. Cl.[4] F02M 1/08
U.S. Cl. 123—187.5 R 3 Claims

1. A start-fuel supply device in an internal combustion engine for a portable equipment comprising a start-fuel primer pump rotatively coupled to a starter motor of the engine, a fuel metering device for receiving a charge of fuel from a metering

chamber of a carburetor during the reverse rotation of the start-fuel primer pump, and a fuel nozzle for injecting fuel from



the fuel metering device to an air intake passage of the carburetor during the normal rotation of the fuel-start primer pump.

4,893,594

START-FUEL SUPPLY DEVICE IN INTERNAL COMBUSTION ENGINE FOR PORTABLE EQUIPMENT

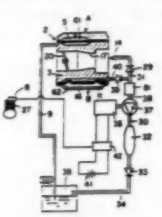
Takeshi Kobayashi, Yokohama, Japan, assignor to Walbro Far East, Inc., Kawasaki, Japan

Filed Nov. 21, 1988, Ser. No. 273,890

Claims priority, application Japan, Dec. 1, 1987, 62-303806

Int. Cl.[4] F02M *1/08*

U.S. Cl. 123—187.5 R **7 Claims**



1. Start-fuel supply device in an internal combustion engine for portable equipment characterized in that a fuel nozzle is disposed at an intake passage of a diaphragm type carburetor, a fuel reservoir is connected to the metering chamber of the diaphragm carburetor through a check valve, a fuel metering device, a reversible primer pump, and a passage between the check valve and the fuel metering device connected to the fuel nozzle via a second check valve which allows a flow to the fuel nozzle.

4,893,595

DAMPING BLOCK DESIGNED IN PARTICULAR FOR MOUNTING AN ENGINE IN A MOTOR VEHICLE

Theobald Mertens, Niederfischbach, Fed. Rep. of Germany, assignor to General Motors Corporation, Detroit, Mich.

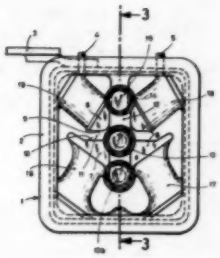
Continuation-in-part of Ser. No. 135,009, Dec. 18, 1987, Pat. No. 4,829,953. This application Jun. 27, 1988, Ser. No. 211,796

Claims priority, application Fed. Rep. of Germany, Jul. 25, 1987, 3724771

Int. Cl.[4] F16F *1/52*; B60K *5/12*

U.S. Cl. 123—192 R **7 Claims**

1. A motor vehicle engine mount comprising a rigid outer portion, a rigid inner portion connected to the outer portion by flexible rubber webs, said inner portion having two inner bodies which are opposite each other and spaced apart and which are connected to each other by an adjustable connecting piece for transmitting forces from one inner body to the other, characterized in that the rubber webs are connected non-releasably to the two inner bodies and the connecting piece includes adjustable securing means detachably bridging the inner bodies, and further characterized in that the connecting piece is



connected to one of the inner bodies by a release member operating in a slot in the connecting piece that allows limited movement between the connecting piece and said one inner body.

4,893,596

COMBUSTION CHAMBER FOR SPARK IGNITED ENGINE

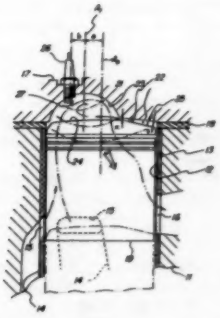
Kimihiro Nonaka, Hamamatsu, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Shizuoka, Japan

Filed Dec. 1, 1986, Ser. No. 936,337

Claims priority, application Japan, Nov. 29, 1985, 60-267418

Int. Cl.[4] F02B *23/00*

U.S. Cl. 123—193 P **10 Claims**



1. In a two cycle crankcase compression type internal combustion engine having a cylinder defining a cylinder bore, a piston reciprocating in said cylinder bore, a cylinder head affixed to said cylinder and closing said cylinder bore, a cylinder head gasket between said cylinder head and said cylinder and surrounding said cylinder bore, a clearance volume defined between said cylinder head and said piston when said piston is in the top dead center position, the peripheral edge of said piston being below said cylinder when said piston is in top dead center position, said clearance volume including a combustion recess formed in said cylinder head surrounded at least in part by a squish area adjacent at least a portion of said cylinder bore, said squish area having a height in the direction of the axis of said cylinder bore greater adjacent said cylinder bore than at a point spaced inwardly toward said cylinder bore axis for providing clearance between said piston and said cylinder head and said cylinder head gasket, a spark plug in said cylinder head with the gap in said combustion recess, and

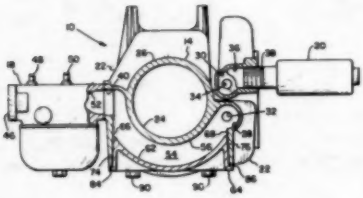
intake ports and exhaust ports in said cylinder configured to achieve loop scavenging, said combustion recess being disposed on the side of said cylinder bore opposite to said exhaust port.

4,893,597

ENGINE CYLINDER ASSEMBLY HAVING AN INTAKE CROSS-PASSAGEWAY

William C. Kandler, New Holstein, Wis., assignor to Tecumseh Products Company, Tecumseh, Mich.

Filed Apr. 24, 1989, Ser. No. 342,186
Int. Cl.[4] F02F 7/00
U.S. Cl. 123—195 HC **13 Claims**



1. In an internal combustion engine of the type having a crankshaft and a cylinder, a cast cylinder assembly comprising:

a cast cylinder including: a piston bore, an intake valve cavity for receipt of an intake valve, an exhaust valve cavity for receipt of an exhaust valve, the intake and exhaust valve cavities located proximate one another on one side of the piston bore, an integrally cast cross-passageway communicating with the intake valve cavity and curving around the piston bore to the other side of the piston bore opposite the intake and exhaust valve cavities, an opening having side walls communicating with the cross-passageway and open to the exterior of the cylinder;

a cover having side walls and a curved inner surface having a curvature corresponding to the curvature of the cross-passageway, the curved inner surface and side walls of the cover being disposed within the opening with the side walls of the cover lying adjacent the side walls of the opening; and

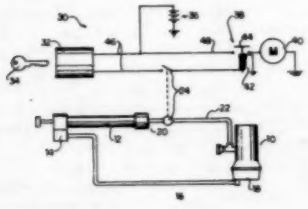
means for sealing the cover to the cylinder to preclude air passage through the opening.

4,893,598

PRE-START LUBRICATOR

Michael Stasiuk, Vancouver, Canada, assignor to Stasiuk Engineering Ltd., Vancouver, Canada

Filed Apr. 18, 1989, Ser. No. 339,699
Int. Cl.[4] F01M 1/00
U.S. Cl. 123—196 S **8 Claims**



1. An oiling apparatus for an internal combustion engine comprising:

a manually actuated positive displacement oil pump with an inlet and an outlet;

an oil suction line connecting the oil pump inlet to an engine oil sump;

an oil feed line connecting the oil pump outlet to an oil gallery in the engine;

an oil pressure switch in the oil feed line, normally open and closing in response to the presence of an oil pressure in the feed line greater than a predetermined pressure;

an ignition switch, normally open, and selectively closed by an operator for starting the engine;

a relay switch, normally open, with two switched terminals and a coil;

a starter motor;

an electric battery;

a first electric line connecting the battery to the relay coil through the ignition switch and the oil pressure switch such that the coil is energized and the switched terminals of the relay are closed only when the ignition switch is closed and the oil pressure in the oil feedline is above said predetermined oil pressure;

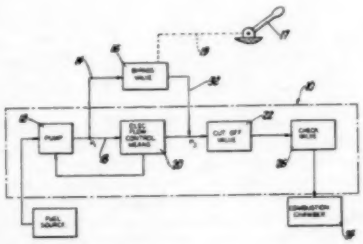
a second electric line connecting the battery to the starter motor through the switched terminals of the relay, such that the starter motor is disabled until the ignition switch is closed and the oil pressure in the feed line is above said predetermined pressure.

4,893,599

MANUAL BYPASS FOR AN ELECTRONIC FUEL INJECTOR

George Meinik, New Castle County, Del.; Bruce Amrein, Harford County, Md.; Curtis L. McCoy, Harford, Md., and James A. Martin, Lancaster, Pa., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 7, 1988, Ser. No. 268,812
Int. Cl.[4] F02M 39/00
U.S. Cl. 123—198 D **12 Claims**



1. A bypass mechanism for an electronically governed fuel flow control means, comprising:

a valve assembly including a housing defining a fuel entry chamber, a fuel exit chamber, a bore intersecting the fuel entry chamber, and a flow restriction orifice connecting the bore to the fuel exit chamber;

the bore defining a radially smaller cylinder and a radially larger cylinder, the larger cylinder being at least partly threaded;

a rotatable metering shaft in the bore having a threaded end matingly engaged with the larger cylinder, the shaft defining a pin-like end in the fuel entry chamber having an end face opposed to and larger than the orifice, the shaft having a shank fitting closely through the smaller cylinder, the pin-like end being no shorter than the width of the fuel entry chamber, so the shank never enters the fuel entry chamber to affect flow therein, the juxtaposition of the end face and the orifice being substantially the sole means to vary flow into the orifice;

an elongate frame demountably attached to the engine compartment of a tank and having the housing mounted to one end thereof;

a lever attached to the metering shaft in the housing;

a push-pull cable connected to actuate the lever, the cable detachably and slideably retained at the other end of the frame, the cable extending into connection with a remote manual control means for rotating the metering shaft.

4,893,600

ADAPTIVE CONTROL FOR AN INTERNAL COMBUSTION ENGINE

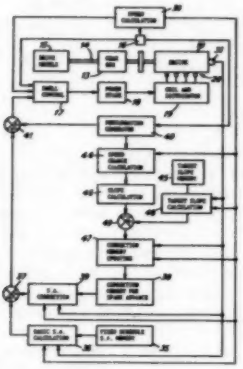
Michael Holmes, Dorridge, United Kingdom, assignor to Lucas Industries plc, Birmingham, England

Filed Jun. 27, 1988, Ser. No. 212,319

Claims priority, application United Kingdom, Jun. 27, 1987, 8715130

Int. Cl.[4] F01P 5/15; F02D 41/26

U.S. Cl. 123—419 59 Claims



1. An adaptive control system for an internal combustion engine having cylinders and at least one engine control parameter affecting an engine output, said control system comprising;

(a) means for establishing a base value for an engine control parameter;

(b) perturbation generation means for perturbing said an engine control parameter about said base value, said perturbation means comprising means for generating a perturbation waveform having a cycle comprising a first part and a second part and for applying a positive perturbation to said an engine control parameter during said first part of each said cycle and a negative perturbation to said an engine control parameter during said second part of each said cycle, said first part and said second part of said waveform having respective durations such that each cylinder of said engine experiences equal numbers of said positive perturbations and said negative perturbations compared with other cylinders irrespective of engine speed;

(c) monitoring means for monitoring said engine output;

(d) slope calculation means, responsive to said monitoring means, for calculating a slope of said engine output with respect to said an engine control parameter; and

(e) correction means, responsive to said slope calculation means, for applying corrections to said at least one engine control parameter so as to obtain a desired value of said slope, wherein said engine has a drivetrain combination having at least one resonant frequency, and said perturbation waveform has a perturbation frequency greater than said resonant frequency of said drivetrain.

4,893,601

MANIFOLD FOR CONVEYING A HIGH-PRESSURE FUEL

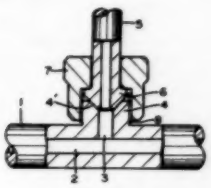
Keizo Sugao, Tagata, Japan, assignor to Usui Kokusai Sangyo Kaisha Ltd., Sunto, Japan

Filed Apr. 15, 1988, Ser. No. 182,102

Claims priority, application Japan, May 23, 1987, 62-78009[U]

Int. Cl.[4] F02M 35/00

U.S. Cl. 123—468 8 Claims



1. In a manifold for conveying a high-pressure fuel of at approximately 1000 kg/cm^2 comprising a metal main pipe having an outside diameter of approximately 20 mm and a wall thickness of approximately 6 mm, said main pipe having an axial bore and a plurality of ports formed through its wall, connected with said bore and spaced apart from one another along the length of said pipe, and a plurality of branch pipes each connected at one end thereof with one of said ports, the improvement wherein said main pipe is provided with a plurality of short cylindrical projections unitary with said main pipe and extending laterally outwardly from its wall and each having an axial bore defining one of said ports and a wall thickness approximately equal to the wall thickness of the main pipe, each of said projections having an outer end provided with a recessed surface, and an outer peripheral surface provided with a screw thread, and each of said branch pipes has a diametrically enlarged connecting head closely fitting said recessed surface of one of said projections and is provided with a nut cooperating with said screw thread for holding said head against said recessed surface.

4,893,602

PROCESS FOR FUEL METERING

Helmut Gross, Gerlingen; Wolfgang Höptner, Uhingen, and Günther Kaiser, Stuttgart, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

PCT No. PCT/DE87/00283, § 371 Date Mar. 2, 1988, § 102(e) Date Mar. 2, 1988, PCT Pub. No. WO88/00285, PCT Pub. Date Jan. 14, 1988

PCT Filed Jun. 23, 1987, Ser. No. 165,274

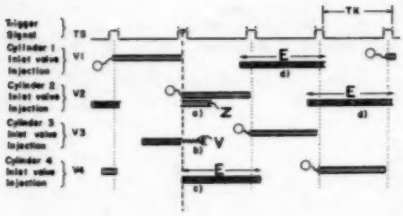
Claims priority, application Fed. Rep. of Germany, Jul. 9, 1986, 3623041

Int. Cl.[4] F02D 41/10, 41/34

U.S. Cl. 123—492 3 Claims

1. A process for metering fuel into a plurality of cylinders of an internal combustion engine during acceleration operations, said cylinders having a plurality of intake valves for said fuel, comprising the steps of determining an operating state; injecting a fuel quantity corresponding to said operating state so determined; determining an acceleration state; establishing an additional fuel quantity associated with said acceleration state; injecting said additional fuel quantity of said acceleration state after determining said acceleration state; delivering said additional fuel quantity after determining said acceleration state to at least one of said cylinders having an open intake valve; prolonging said injecting of said fuel quantity corresponding to said operating state of at least one other of said cylinders in which said injecting has not been concluded when said acceler-

ation state has been determined; and immediately injecting in another of said cylinders when said acceleration state has been



detected said fuel amount determined in correspondence with said operating state that was to be injected at a future time.

4,893,603

LOW PRESSURE FUEL INJECTION SYSTEM WITH FUEL PREHEATING FOR AN AIR-COMPRESSING, INJECTION INTERNAL COMBUSTION ENGINE

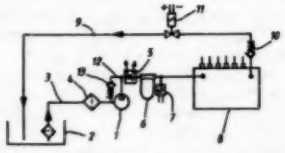
Karl-Heinz Siebels, Stuttgart, Fed. Rep. of Germany, assignor to Daimler-Benz AG, Stuttgart, Fed. Rep. of Germany

Filed Mar. 31, 1988, Ser. No. 176,278

Claims priority, application Fed. Rep. of Germany, Mar. 31, 1987, 3710807

Int. Cl.[4] F02M *31/12, 37/18, 37/22, 55/00*

U.S. Cl. 123—514 **6 Claims**



1. Low pressure fuel system with fuel preheating for an air-compressing, injection internal combustion engine, having a supply main connected to a fuel tank and leading via a feed pump to a high pressure injection pump: a heat exchanger effective at low fuel temperature, a prefilter and a fine filter are in said supply main, a return main between the high pressure injection pump and the fuel tank; said high pressure injection pump; and a shut-off valve means in the return main for interrupting fuel return at low fuel temperatures without return to said main supply; and a thermostat in the supply main between said prefilter and said high pressure injection pump, for controlling fuel flow to aid heat exchanger.

4,893,604

FUEL SYSTEM FOR INTERNAL COMBUSTION ENGINE

Geoffrey W. West, Freehills, Dodwell Lane, Bursledon, Hampshire, England

Continuation of Ser. No. 26,577, Mar. 3, 1987, abandoned. This application Nov. 4, 1988, Ser. No. 270,481

Claims priority, application United Kingdom, Jul. 4, 1985, 8516939

Int. Cl.[4] F02M *31/00, 31/08*

U.S. Cl. 123—543 **9 Claims**

1. A fuel system for an internal combustion spark ignition engine having an inlet manifold with a pressure depression for receiving a charge of air and an exhaust manifold for discharging hot exhaust gases, comprising:

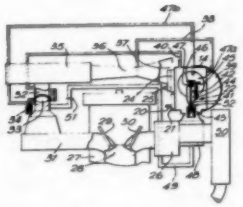
means for conveying a charge of air to the inlet manifold;

a venturi-type spray nozzle for atomizing fuel;

fuel metering and regulating means for supplying liquid fuels to said venturi-type spray nozzle at a regulated pressure which is not subjected to the inlet manifold pressure depression, for atomizing the liquid fuel, said metering and regulating means having a fuel exit;

means defining a space between said fuel exit and said spray nozzle and across which the metered and regulated liquid fuel flows to the spray nozzle for mixing of the metered and regulated liquid fuel with air from said space to form an atomized air/fuel mixture, said space being maintained at atmospheric pressure not being subjected to the inlet manifold pressure depression;

heat exchanger means with a heated surface connected in heat exchange relationship to the exhaust manifold for receiving heat from the exhaust gases, said spray nozzle



being connected to said heat exchanger means for directly spraying the atomized fuel onto the heated surface of the heat exchanger means to heat the atomized fuel to form a vaporized gaseous fuel, said heat exchanger means including a portion surrounding the exhaust manifold for being heated by exhaust gases passing through the exhaust manifold and means for swirling the hot exhaust gases leaving the exhaust manifold for increasing an exchange of heat between the hot exhaust gases and said heat exchanger means; and

means for conveying the vaporized gaseous fuel from said heat exchanger means to the inlet manifold for mixture of the gaseous fuel with the charge of air supplied to the inlet manifold.

4,893,605

IGNITION DEVICE FOR INTERNAL COMBUSTION ENGINE

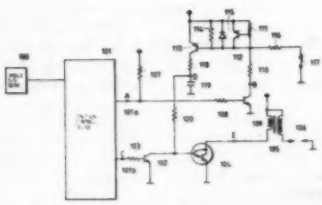
Masayuki Ozawa, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 24, 1988, Ser. No. 211,013

Claims priority, application Japan, Jun. 25, 1987, 62-158032; Jun. 25, 1987, 62-158033

Int. Cl.[4] F02P *1/08*

U.S. Cl. 123—651 **3 Claims**



1. An ignition device for an internal combustion engine, comprising: an angle signal generator for producing a timing signal in synchronism with an engine rotation, an ignition control device responsive to an output signal of said angle

signal generator for performing a predetermined ignition timing calculation to produce an ignition timing control signal, and for detecting an engine stop condition to produce a stop signal, a semiconductor switch element having a control gate supplied with said ignition timing control signal for supplying current to an ignition coil upon receipt of said ignition timing control signal to on-off control the current supply to said ignition coil, a capacitor for supplying charge to said control gate of said semiconductor switch element, a switch circuit for maintaining said capacitor fully charged by continuously supplying a current thereto during normal running of the engine, and means for cutting said current to said capacitor off when either said ignition control device produces said stop signal or a stop switch is operated such that said capacitor gradually discharges to a level at which said switch element is rendered non-conductive, to thereby preclude dieseling or the like.

4,893,606

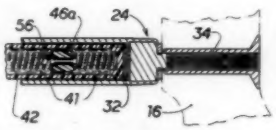
DISTRIBUTED MASS, INERTIAL ARCHERY BOW STABILIZER AND VIBRATION DAMPER

Frank W. Sisko, 159 Elkin Ave., Indiana, Pa. 15701

Filed Aug. 19, 1988, Ser. No. 233,807

Int. Cl.[4] F41B *5/00*

U.S. Cl. 124—89 **11 Claims**



1. A stabilizer for an archery bow, comprising:

an elongated casing defining a central chamber;

means at one end of the casing for mounting the stabilizer to project forwardly from the bow at an angle substantially normal to the bow string;

the central chamber extending from immediately adjacent the mounting means and along the entire length of the casing;

a high density fluid in the chamber occupying the chamber's full length but less than the chamber's full space whereby the fluid is inertially responsive to shifting;

flow restricting means in the chamber for restricting fluid shifting in one longitudinal direction to a rate substantially less than the rate of fluid shifting in the other longitudinal direction; and

the flow restricting means including a baffle located generally intermediate the length of the casing.

4,893,607

WIRE DRIVE APPARATUS FOR WIRE SAW

Setsuo Kubo, Kyoto, Japan, assignor to Kabushiki Kaisha Dymosha, Japan

Filed Jul. 21, 1988, Ser. No. 222,547

Claims priority, application Japan, Jul. 31, 1987, 62-118367[U]

Int. Cl.[4] B28D *1/08*

U.S. Cl. 125—21 **12 Claims**

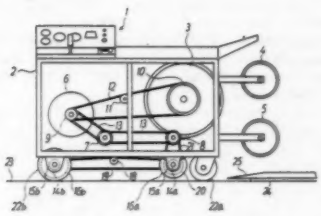
1. A wire drive apparatus comprising:

a carriage;

a plurality of supplemental wheels rotatably mounted to said carriage for movably supporting said carriage on a base surface;

a plurality of rail wheels rotatably mounted to said carriage for movably supporting said carriage on a plurality of rails mounted on the base surface;

pulley means for circulating an endless cutting wire; and



drive means for driving said pulley means and at least one of said rail wheels.

4,893,608

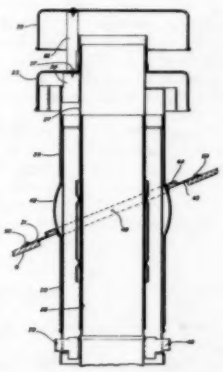
FURNACE ROOF JACK WITH PIVOTING FLASHING PLATE

Greg Reaser, Wichita, Kans., assignor to Coleman Heating & Air Conditioning Products, Inc., Wichita, Kans.

Filed Jul. 5, 1988, Ser. No. 215,272

Int. Cl.[4] F24C *3/00*

U.S. Cl. 126—85 B **9 Claims**



1. A tube assembly for communicating a burner, with the outside of a dwelling through the roof of a dwelling comprising an elongated cylindrical tube adapted to be attached to the burner, and a substantially flat flashing plate having an opening through which the tube extends, the flashing plate engaging the tube and being pivotally attached to the tube for pivoting movement about an axis which extends perpendicularly to the axis of the tube, whereby the tube can extend through an opening in the roof of the dwelling and the flashing plate can be secured to the roof.

4,893,609

WIND-RESISTANT OUTDOOR HEATING APPLIANCE

Attilio G. Giordani, Panorama City, Calif., and Jack W. Sergeant, East Greenwich, R.I., assignors to Teledyne Industries, Inc., Los Angeles, Calif.

Filed Sep. 26, 1986, Ser. No. 912,519

Int. Cl.[4] F23I *11/00*

U.S. Cl. 126—350 R **53 Claims**

1. In a method of providing and operating an outdoor heat-

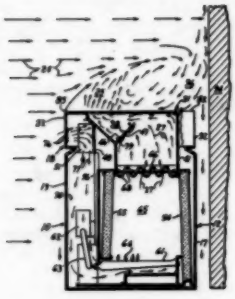
ing appliance wherein internal flames produce flue products inside a housing of said heating appliance,

the improvement of rendering the operation of the heating appliance wind resistant, comprising in combination the steps of:

providing said heating appliance above said housing with a top structure having a top surface;

defining said top surface with a stationary airfold generating in a region above said top surface and in response to wind an air pressure lower than an air pressure of said wind;

providing below said top surface and said airfoil inlet openings for receiving part of said wind;



penetrating said top surface with exhaust openings for said flue products in said region, whereby said flue products are exhausted from said outdoor heating appliance by said wind; and

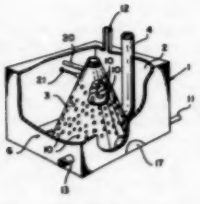
sustaining combustion generating said flue products inside the heating appliance and imparting to said flue products a positive pressure toward the exhaust openings aiding exhaustion of said flue products during occurrence of said wind by providing wind deflectors or diverters inside said inlet openings and by guiding air from said received part of the wind with said wind deflectors or diverters into and through a channel in the heating appliance to said internal flames.

4,893,610

LIQUEFIED PETROLEUM GAS AND ELECTRIC WATER HEATER

Jong K. Kang, 393-1 Daga-Dong, Cheonan-Si, Choongnam-Do, Rep. of Korea

Filed May 31, 1989, Ser. No. 359,693
Int. Cl.[4] F24C 5/04
U.S. Cl. 126—360 R **8 Claims**



1. A liquefied petroleum gas and electric water heater comprising:

a water heater body,

a water tank disposed within said water heater body, said water tank including:

a conical combustion chamber, disposed therewithin containing a plurality of water conduits, said conical combustion chamber containing a burner disposed therewithin for exposing the flame from said burner to the outer surface of said plurality of water conduits so as to uniformly heat the water in the water tank, and

a separate electric heater disposed therewithin,

a control box associated with said burner in the conical combustion chamber and said separate electric heater for selecting as a heat source the burner or the electric heater so as to efficiently, economically heat the water in the water tank, said control box being provided with an on/-off switch connected to an ignition spark for said burner and being electrically connected to said electric heater,

means for sensing the temperature of the water in the water tank, and

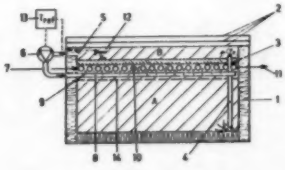
means for monitoring the temperature, the pressure, and the flame of the water heater.

4,893,611

SOLAR ENERGY COLLECTION AND STORAGE APPARATUS

Jürgen Kleinwächter, Kandern-Egisholz, Fed. Rep. of Germany, assignor to Ulrich Laboschik, Fed. Rep. of Germany

Filed Nov. 14, 1988, Ser. No. 271,214
Int. Cl.[4] F24J 2/20
U.S. Cl. 126—437 **5 Claims**



1. An apparatus for the collection and storage of solar energy, comprising:

a storage container having a transparent covering, a dark absorbent bottom, and delivery and offtake lines for fresh and industrial and household water, said dark bottom comprising thermally insulating intermediate bottom dividing the container horizontally into a smaller upper water volume and a larger lower water volume; and a device for attaining a thermal equalization between the upper volume and the top of the lower volume wherein the device for thermal equalization comprises a pump apparatus for drawing water from the upper volume and delivering water to a top portion of the lower volume, and at least one connecting line penetrating the intermediate bottom.

4,893,612

RADIANT ENERGY COLLECTOR

Robert E. Dawson, 1656 Susquehanna Rd., Rydel, Pa. 19046

Continuation-in-part of Ser. No. 124,032, Feb. 25, 1980, abandoned, which is a continuation of Ser. No. 907,151, May 17, 1978, abandoned. This application Nov. 17, 1987, Ser. No. 121,716
Int. Cl.[4] F24J 2/08, 2/10
U.S. Cl. 126—438 **33 Claims**

1. A radiant energy collector for receiving and collecting incident radiation, comprising:

A. an absorber;

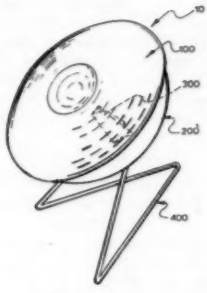
B. reflector means surrounding the absorber and having an upright axis and a concave reflective inner surface distributed about the axis for reflecting said radiation onto the absorber; and

C. a lens member extending across the axis of and above the reflector means for receiving an energy flux from a source

of radiant energy and having a plurality of prismatic elements distributed about the reflector axis in the lens member for

(1) receiving incident radiation on one side of the axis from a source located on the other side of the axis, the axis being viewed perpendicular to a plane including the axis and passing through the source, and

(2) maintaining, during variation of the angle of incidence between the incident radiation and the axis as viewed in said plane, refraction of the incident radiation and emission of the resultant refracted radiation through emitting surfaces of said elements which are inclined for continuing during such variation, to direct radiation away from the source, above the absorber and toward the reflector with an upward component of refraction as compared to the inclination of the incident radiation and to distribute the resultant reflected radiation across a portion of the absorber which faces away from the source,



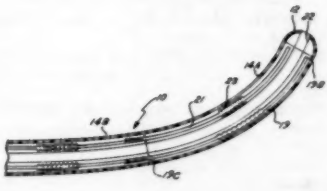
whereby re-reflection and loss of rays can be controlled and the collector can operate efficiently throughout a substantial range of angles of incidence.

4,893,613

ENDOSCOPE CONSTRUCTION WITH MEANS FOR CONTROLLING RIGIDITY AND CURVATURE OF FLEXIBLE ENDOSCOPE TUBE

Lawrence W. Hake, R.R. #2, P.O. Box 108, Grand Island, Nebr. 68803

Continuation of Ser. No. 125,534, Nov. 25, 1987. This application Oct. 21, 1988, Ser. No. 260,522
Int. Cl.[4] A61B *1/00*
U.S. Cl. 128—4 **6 Claims**



1. In a flexible endoscope of the type including an elongate flexible tube having a distal end and a proximal end; and

a medical procedure system having at least a part thereof extending through the tube from the proximal end to the distal end, said system being capable of transmitting diagnostic data from the distal end to the proximal end or conducting a medical procedure at the distal end from the proximal end;

the improvement comprising, in combination:

means within the tube for controlling the curvature of a longitudinal segment of the tube; and

means external the tube for controlling the means within the tube segment;

said means for controlling curvature comprising at least one flexible tube segment, said segment having a longitudinal center axis, said segment further including at least two longitudinal, flexible, hollow conduits generally parallel to the axis, said conduits each being elastically deformable in the longitudinal direction in response to increased pressure within the conduits; and

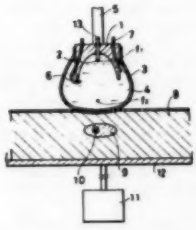
said means for controlling comprising means for inflating the conduits independently by increasing fluid pressure in one of the conduits beyond the plastic limit to thereby elastically deform the conduit in the longitudinal direction and effect elongation of said conduit and attached tube to thereby effect controlled curvature of the tube segment.

4,893,614

APPARATUS FOR DISINTEGRATING A CALCULUS BY AN UNDERWATER SHOCK WAVE FROM OUTSIDE THE HUMAN BODY

Kazuyoshi Takayama; Masaaki Kuwahara, both of Miyagi, and Shuzo Kimura, Chiba, all of Japan, assignors to Yachiyoda Sangyo Co. Ltd., Tokyo, Japan

Continuation of Ser. No. 878,236, Jun. 25, 1986, abandoned. This application Apr. 29, 1988, Ser. No. 188,671
Claims priority, application Japan, Jun. 26, 1985, 60-137997
Int. Cl.[4] A61B *17/22*
U.S. Cl. 128—24 A **33 Claims**



31. An apparatus for disintegrating a calculus in a human body, said apparatus comprising:

(a) a shock wave generation chamber having a solely pseudo-elliptical interior surface, an end surface with an opening therethrough, and a substantially solid exterior side surface;

(b) an entirely flexible container adapted to receive and hold a liquid, said container having an open mouth portion which is positioned about the exterior side surface of said shock wave generation chamber, said flexible container further having an interior which is in fluidic communication with the solely pseudo-elliptical interior surface and a portion of the exterior side surface of said shock wave generation chamber; and

(c) means for attaching said exterior side surface of said shock wave generation chamber to an interior surface of the mouth of said container wherein most of the exterior side surface of said shock wave generation chamber is in fluidic communication with the interior of the flexible container.

4,893,615

OXYGENATION AND RELAXATION CABIN

Lioutsia Khabirova, 17 allée de l'Arlequin, 92000 Nanterre, France

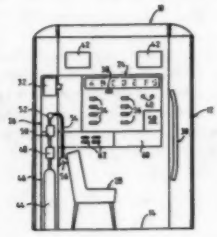
PCT No. PCT/FR87/00294, § 371 Date Mar. 23, 1988, § 102(e) Date Mar. 23, 1988, PCT Pub. No. WO88/00480, PCT Pub. Date Jan. 28, 1988

PCT Filed Jul. 24, 1987, Ser. No. 180,983

Claims priority, application France, Jul. 24, 1986, 86 10765

Int. Cl.[4] A61H *1/00, 21/00*

U.S. Cl. 128—24.2 3 Claims



1. In a controlled environment enclosure wherein an occupant may selectively control and regulate environmental conditions within the enclosure, the combination comprising a closed housing including an access door for ingress and egress to and from the interior of said housing, occupant support means within said housing, self-contained air supply means for said enclosure including means for selectively delivering said air generally into said housing or directly to a user oriented delivery mask, means for regulating and varying the quality and condition of the air supplied by said air supply means, variable lighting means within said housing controllable by the occupant, audio-visual generating means and control means therefor in said housing operable by the occupant, check controlled latching means for said access door to said housing variable to enable a user to select a predetermined occupancy period in response to payment of a corresponding sum of money, timing means interconnected between said latch and the various control devices within said housing to initiate and terminate actuation thereof in accord with the predetermined occupancy period selected and paid for by the user, and means associated with said access door and responsive to opening of said access door for actuating said air supply means at the end of each user occupancy to provide a fresh supply of air for a subsequent occupant.

4,893,616

IMPOTENCE SUPPORT

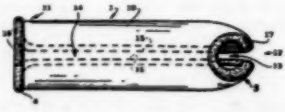
Toivo Immonen, Vellamonkatu 16 A 1, SF-00550 Helsinki, Finland

Filed Jan. 27, 1988, Ser. No. 148,857

Claims priority, application Fed. Rep. of Germany, Jul. 17, 1987, 3723746

Int. Cl.[4] A61F *5/41*

U.S. Cl. 128—79 10 Claims



1. A penis support for enabling sexual intercourse to be performed by a sufferer of impotency, comprising a tubular shell element having a first open end for facing the root of the penis and a second open end for facing the top of the penis, and a longitudinal split extending down said tubular shell element from said first open end to said second open end; wherein said second open end is formed with a mouth portion adapted to fit behind the penis glans and to prevent the penis foreskin from moving to the glans neck groove or over the glans; said longitudinal split has lipwise strengthened, opposing edges; and end portion of said second open end is shaped to taper curvingly towards the glans, an upper half of said second open end portion tapering towards the glans, and in which a wall surface limited by the mouth portion of the tubular shell element is anatomically shaped to correspond to and give support to the sloping rear surface of the glans, an edge of the wall of the tubular shell element limiting the open end being shaped and dimensioned to fit the deepening of the neck groove of the glans; wherein a lower half of said second open end divided by the longitudinal split tapers towards the glans, and in which there are outer tips of the tubular shell element, and in which bordering edges of the tubular shell element are shaped to leave the frenum of the penis free and to come into the deepening of the neck groove of the glans with the tips of the tubular shell element.

4,893,617

RESILIENT SEMI-RIGID ORTHOPEDIC SUPPORT DEVICES

Dennis C. Bartish, and Anthony J. Campagna, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 903,281, Sep. 3, 1986. This application Aug. 7, 1987, Ser. No. 83,685

Int. Cl.[4] A61F *5/04, 15/00*

U.S. Cl. 128—90 26 Claims

1. A method of supporting a body part, the method comprising the steps of:

wrapping a layer of cushioning material around the body part;

preparing a flexible sheet material impregnated with a curable resin, which resin-impregnated sheet material, upon exposure to a curing agent, is capable of being cured into a resilient and semi-rigid state having an Immobilization Value between about 45 pounds and about 400 pounds and a Resiliency Value of at least about 80 percent;

exposing said resin-impregnated sheet material to the curing agent;

wrapping said resin-impregnated sheet material around the cushioning material; and

allowing said resin-impregnated sheet material to cure such that said resin-impregnated sheet material has an Immobilization Value between about 45 pounds and about 400 pounds and a Resiliency Value of at least about 80 percent.

4,893,618

EXTERNAL FIXATION APPARATUS

Wolfgang Herzberg, Holmer Strasse 165, D-2000 Wedel/Holstein, Fed. Rep. of Germany

PCT No. PCT/EP87/00486, § 371 Date Apr. 21, 1988, § 102(e) Date Apr. 21, 1988, PCT Pub. No. WO88/01488, PCT Pub. Date Mar. 10, 1988

PCT Filed Aug. 26, 1987, Ser. No. 188,398

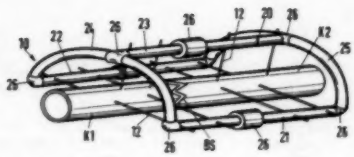
Claims priority, application Fed. Rep. of Germany, Aug. 26, 1986, 3628972

Int. Cl.[4] A61F *5/04*

U.S. Cl. 606—54 26 Claims

1. An external bone fixation apparatus, comprising at least one flexible tube-shaped portion which is externally arrangeable on a patient, opposite bone fragments to be fixed; and connecting means securable in the bone fragments for connecting with the at least one flexible tube-shaped portion, the tube-shaped portion being filled with a hardenable material which, subsequent to hardening thereof, forms a rigid frame with the connecting means so as to hold the bond fragments in a desired

position to enable healing thereof, the tube-shaped portion being formed of a glass fiber-reinforced material, and one of transparent and clear plastic in the shape of a spiral tube having



a bead-like reinforcement which is arranged in a closed tube system, the hardenable material being a quick-curing plastic which is filled into the interior of the closed tube system.

4,893,619

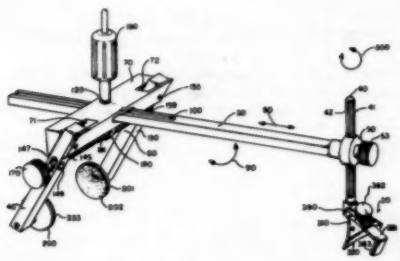
HUMERAL OSTEOTOMY GUIDE

James L. Dale, Austin; Brian D. Burkinshaw, Pflugerville, and Wayne Z. Burkhead, Dallas, all of Tex., assignors to Intermedics Orthopedics, Inc., Austin, Tex.

Filed Feb. 4, 1988, Ser. No. 152,145

Int. Cl.[4] A61F *5/04*

U.S. Cl. 606—87 **21 Claims**



19. A device for guiding an osteotomy to be performed on the proximal end of a humerus comprising:

a proximal sawguide alignable on a selected surface of the proximal end of the humerus for defining a saw line theron;

a radial arm connecting the sawguide to a distal means for stably aligning the sawguide, the distal alignment means comprising a pair of opposing lateral and medial epicondyle arms pivotably engageable with the lateral and medial sides of the distal end of the humerus, the epicondyle arms being pivotably mounted in a distal cross arm, the distal end of the radial arm being slidably mounted in the cross arm for distal to proximal slidable movement therein;

the proximal end of the radial arm being rotatably connected to the sawguide through a proximal guide bar;

the radial arm being supported above the humerus by the proximal guide bar and the epicondyle arms.

4,893,620

MULTIPURPOSE NASAL AIRWAY

Rajindar K. Wadwha, 2482 Mt. Royal Rd., Pittsburgh, Pa. 15217

Continuation-in-part of Ser. No. 716,589, Mar. 27, 1985, abandoned. This application Feb. 18, 1988, Ser. No. 157,946

Int. Cl.[4] A61M *25/00, 15/06, 15/08, 17/32*

U.S. Cl. 128—202.13 **21 Claims**

1. A nasal airway comprising

a tubular housing having a first end and a second end,

a first internal threaded portion at the first end of said tubular housing and a second internal threaded portion at the second end thereof,

an airway tube being of smaller diameter than said housing, said airway tube having a free end insertable into a patient's nostril and an external threaded portion on the opposite end from said free end,

said airway tube when in a storage position having said free end within said tubular housing and said external threaded portion secured to said first internal threaded portion of said tubular housing and when in a use position having said free end external of said tubular housing and said external threaded portion secured to said first internal threaded portion of said tubular housing,

tracheostomy tube means removably secured within said housing generally adjacent to said second end, and

cannula means removably secured within said tracheostomy tube means.

4,893,621

SLIPOVER ANTEGRADE LOADING CALCULUS EXTRACTION INSTRUMENT SYSTEM

Arnold M. Heyman, 2071 W. Alameda Ave., Ste. 406, Burbank, Calif. 91505

Filed Aug. 22, 1986, Ser. No. 899,669

Int. Cl.[4] A61B *17/00*

U.S. Cl. 606—127 **7 Claims**

1. A method for passing a medical instrument system through a ureter and beyond a lodged foreign body, said medical instrument system comprising:

a flexible thin guide with a fine soft bendable tip for passing along said tubular body beyond said lodged foreign body;

an elongated hollow tubular catheter, said catheter having an inner diameter larger than said outer diameter of said guide and adapted to be passed over said guide, and byond said lodged foreign body; and

an umbrella like stone basket, said basket having open and closed modes, said closed mode being when said basket has its smallest cross-sectional area, said open mode being when said basket has its largest cross-sectional area, when open said basket configured to entangle and extract lodged foreign bodies in an antegrade manner and when closed said basket configured to pass through and within said catheter and exit from said catheter; the method comprising the steps of:

passing said guide through said tubular body beyond said lodged foreign body;

coaxially sliding said catheter over said guide up said ureter to be positioned beyond said lodged foreign body;

removing said guide; and

passing coaxially within said positioned catheter said stone basket to be positioned beyond said foreign body for its extraction, said basket being in a closed position as it proceeds through said catheter.

4,893,622

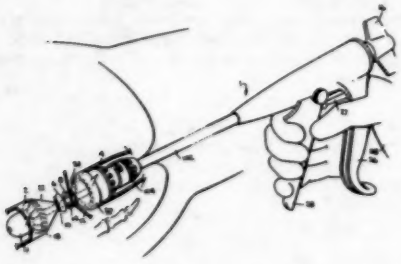
METHOD OF STAPLING TUBULAR BODY ORGANS

David T. Green, Norwalk, and Herbert W. Korthoff, Wilton, both of Conn., assignors to United States Surgical Corporation, Norwalk, Conn.

Division of Ser. No. 920,581, Oct. 17, 1986, Pat. No. 4,752,024. This application Mar. 31, 1988, Ser. No. 176,229

Int. Cl.[4] A61B *17/04*

U.S. Cl. 227—180 **4 Claims**



1. A method of stapling the tubular ends of a pair of vessels together, said method comprising the steps of

clamping the tubular ends of the two vessels between an anvil assembly at a distal end of a surgical stapling apparatus and a surgical fastener holding assembly on the apparatus;

driving an annular stapling part located on one side of the clamped ends of the vessels and having prongs thereon through the clamped ends of the vessels in an annular retaining part removably supported on the anvil assembly and on an opposite side of the clamped vessels;

severing the clamped ends of the vessels on a circular cutting line disposed radially within the stapling part;

moving the anvil assembly away from the stapled ends of the vessels to withdraw the anvil assembly from the annular retaining part;

thereafter collapsing the anvil assembly radially inwardly of said retaining part and said cutting line; and

then withdrawing the stapling apparatus from the stapled-together vessels.

4,893,623

METHOD AND APPARATUS FOR TREATING HYPERTROPHY OF THE PROSTATE GLAND

Robert F. Rosenbluth, Laguna Niguel, Calif., assignor to Advanced Surgical Intervention, Inc., San Clemente, Calif.

Continuation-in-part of Ser. No. 939,754, Dec. 9, 1986, Pat. No. 4,762,128. This application Nov. 20, 1987, Ser. No. 120,981

The portion of the term of this patent subsequent to Aug. 9, 2005, has been disclaimed.

Int. Cl.[4] A61M *29/00*

U.S. Cl. 128—343 **17 Claims**

1. An apparatus for relieving the symptoms of hypertrophy of the prostate gland, comprising:

an axially elongate catheter shaft comprising at least one lumen therethrough and having an annular recess thereon for receiving a stent;

an expandable balloon mounted on said shaft in said recess and in communication with said lumen; and

a removably mounted, radially outwardly deformable and expandable tubular stent coaxially disposed about said balloon and situated in said recess, wherein said stent has an opening at each axial end and a central lumen therethrough, wherein said stent is radially expandable by deformation to a preselected configuration in response to pressure from said balloon, and the outside diameter of the stent, in its unexpanded state, is not substantially greater than the outside diameter of the adjacent catheter shaft, and wherein said adjacent catheter shaft has a substantially uniform diameter.

4,893,624

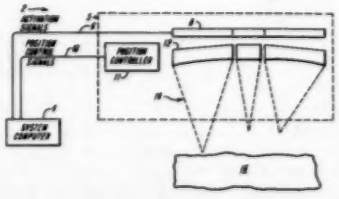
DIFFUSE FOCUS ULTRASOUND HYPERTHERMIA SYSTEM

Padmakar P. Lele, Winchester, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Jun. 21, 1988, Ser. No. 209,520

Int. Cl.[4] A61F *7/00*

U.S. Cl. 128—399 **28 Claims**



1. An ultrasonic hyperthermia system for delivering hyperthermic therapy to a subject, the system comprising:

a plurality of piezoelectric transducer elements arranged in a two-dimensional array to provide multiple sources of ultrasonic energy;

variable activation means for activating the transducer elements individually and at variable electrical energy levels to permit the multiple sources of ultrasonic energy to vary in intensity;

a further plurality of lens elements, coupled to the plurality of transducer elements, to transmit the multiple sources of ultrasonic energy to the subject as a diffuse-focus beam having a selected dimension in a direction substantially perpendicular to a direction of propagation; and

focusing means for dynamically varying the position of the lens elements individually to permit variations in the focal regions of the multiple sources of ultrasonic energy, said variations in focal regions including variations in the selected dimension of the diffuse-focus beam.

4,893,625

INSERTION TYPE ELECTRODE ARRANGEMENT FOR CONTINUOUS PO_2 MEASUREMENT IN LIVING SKIN TISSUE

Rolf Schuhmann, Grosser Hasenpfad 25, D-6000 Frankfurt am Main 70, Fed. Rep. of Germany

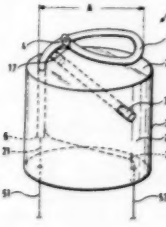
PCT No. PCT/DE86/00210, § 371 Date Jan. 20, 1987, § 102(e) Date Jan. 20, 1987, PCT Pub. No. WO86/06945, PCT Pub. Date Dec. 4, 1986

PCT Filed May 17, 1986, Ser. No. 20,942

Claims priority, application Fed. Rep. of Germany, May 23, 1985, 3518463

Int. Cl.[4] A61B *5/00*

U.S. Cl. 128—635 **13 Claims**



1. A system for continuous pO_2 measurements in living, restlessly moving tissue, comprising an outer spiral metal tube electrode having a longitudinal wall, a spiral tubular plastic body arranged in the outer metal tube and an electrically insulated platinum wire electrode arranged in the spiral plastic body, and a cylindrical plastics body, wherein both metal electrodes (2, 14) are fit with one terminal end (6) in the cylindrical plastics body (26), the electrodes having a free end extending from the plastics body and having a ground-off front end face, the front end face and the longitudinal wall including an angle of about 20°, an insertion assistance means for inserting the electrodes into the tissue, the cylindrical plastics body being fastened in the insertion assistance means, the electrodes extending from the cylindrical plastics body, the system further comprising a pO_2 measuring apparatus, the platinum wire electrode being connected to the pO_2 measuring apparatus, and a second measuring apparatus, the metal tube electrode being connected to the second measuring apparatus, the two measuring apparatus having reference electrodes (54) independent of each other.

4,893,626

ELECTRODE FOR ELECTROTHERAPY, ELECTROSURGERY AND MONITORING

Ernest J. Henley, and William Price, both of 10518 Kinghurst, Houston, Tex. 77099

Filed Dec. 11, 1986, Ser. No. 940,657

Int. Cl.[4] A61B *5/04*; A61N *1/04*

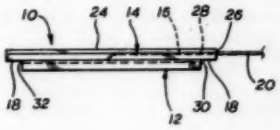
U.S. Cl. 128—640 **18 Claims**

3. An electrode for use in medical devices comprising:

(a) a layer of aqueous conductive gel containing an electrolyte,

(b) an insulating layer comprised of natural rubber,

(c) an electrical current distribution or collection means in electrical contact with said aqueous conductive gel situated between said aqueous conductive gel layer and said insulating layer.



4,893,627

METHOD FOR NUCLEAR MAGNETIC RESONANCE IMAGING USING DEUTERUM AS A CONTRAST AGENT

Joseph J. Kehayias, Chestnut Hill, Mass.; Darrel D. Joel, Setauket, N.Y.; William H. Adams, Eastport, N.Y., and Harry L. Stein, Glen Head, N.Y., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed May 26, 1988, Ser. No. 200,811

Int. Cl.[4] A61B *5/05*

U.S. Cl. 128—654 **2 Claims**

1. A method for in vivo NMR imaging consisting of positioning a patient within the magnetic field of an energized NMR system, administering an acceptable NMR imaging amount of stable, high-purity D_2O in isosmotic water solution by injecting the solution through a catheter into a blood vessel of the patient, said acceptable amount of D_2O being sufficient to enable the administered D_2O to form dark dye-like images as the solution is subjected to the H-1 resonance of the system, said H-1 resonance being effected at a frequency at which D_2O will not resonate, detecting H-1 resonance signals, and processing said signals to provide an image.

4,893,628

DUAL ELEMENT ULTRASONIC TRANSDUCER PROBE FOR COMBINED IMAGING OF TISSUE STRUCTURES AND BLOOD FLOW IN REAL TIME

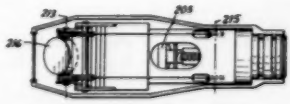
Bjorn Angelsen, Dept. of Biomedical Eng., University of Trondheim, Trondheim-Rit, Norway (N 7006)

Filed Apr. 4, 1988, Ser. No. 176,881

The portion of the term of this patent subsequent to Jul. 19, 2005, has been disclaimed.

Int. Cl.[4] A61B *8/00*

U.S. Cl. 128—660.05 **15 Claims**



1. An ultrasonic probe for use in combined and time shared ultrasonic imaging of biological tissue structures together with blood velocity measurements and imaging of blood flow based on the Doppler principle, in which rapid changes of sweep movements of the probe between the respective imaging measurement modes of operation are performed, said probe having two mechanically steerable ultrasonic beams, comprising:

a linear motion electric drive motor having a stationary magnet means and a coil assembly which is linearly move-

able with respect to said magnet means by the application of electric current to said coil assembly;

two ultrasonic transducers for emitting respective ultrasonic beams and disposed to be pivotable around separate axes within separate angular sectors for sweeping the two ultrasonic beams within the two separate angular sectors, respectively;

mechanical coupling means for connecting the linear drive motor to the pivotable transducer elements, converting the linear motion of the motor coil assembly into a limited rotary motion of the transducers within said angular sectors;

said mechanical coupling means comprising at least three pulleys mounted at a distance from each other, and at least one flexible pulling element trained about and rotatably connecting said at least three pulleys with each other;

said ultrasonic transducers being each rotatably connected to a separate one of the pulleys, and at least one of the pulleys to which one of said transducers is connected having a non-circular circumference with an angle dependent radius; and

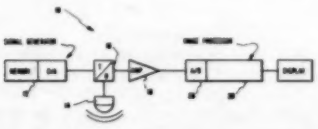
said motor coil assembly being mechanically connected to said at least one pulling element at a portion thereof lying between two pulleys of said at least three pulleys, whereby reciprocating linear movement of the coil assembly causes said angular sweeping of the transducer elements.

4,893,629

ULTRASONIC MEDICAL IMAGING APPARATUS HAVING A POLYVINYLIDENE FLUORIDE TRANSDUCER

George K. Lewis, Andover, Mass., assignor to Analogic Corporation, Peabody, Mass.

Filed Oct. 15, 1987, Ser. No. 111,128
Int. Cl.[4] A61B *8/00*
U.S. Cl. 128—660.07 **5 Claims**



1. An ultrasonic medical imaging apparatus comprising;

an ultrasonic transducer constructed with polyvinylidene fluoride;

circuit means for generating an energizing pulse for the transducer, said pulse having a predetermined length and an instantaneous frequency which is varied by said circuit means from a first frequency to a second frequency during the period;

means for digitizing electrical signals from the transducer which electrical signals represent ultrasonic reflections received by the transducer in response to the energizing pulse; and

signal processing means for cross-correlating the digitized electrical signals with the energizing pulse.

4,893,630

APPARATUS AND METHOD FOR ANALYZING PHYSIOLOGICAL CONDITIONS WITHIN AN ORGAN OF A LIVING BODY

Robert S. Bray, Jr., Houston, Tex., assignor to Trinity Computing Systems, Inc., Houston, Tex.

Filed Apr. 6, 1984, Ser. No. 597,518
Int. Cl.[4] A61B *5/00*
U.S. Cl. 128—671 **23 Claims**

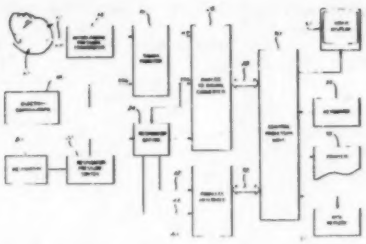
1. An apparatus for analyzing changes in the waveform generated by variations of pressure within an organ of a living body comprising:

pressure sensing means adapted to be placed within an organ of a living body for measuring the pressure within said organ of said body;

pressure transducer means connected to said pressure sensing means for converting the measured values of pressure to an analog electrical signal waveform indicative of the waveform generated by the variations of pressure over time within said organ of said body;

analog to digital converter means electrically connected to said pressure transducer means for converting said analog electrical signal waveform into digital electrical signals indicative of said pressure waveform, for digital computer analysis;

computing means electrically connected to said analog to digital converter means for mathematically computing a



distribution of the amplitude of said pressure waveform versus the frequency components of said pressure waveform and analyzing said frequency distribution to indicate physiological conditions within said organ of said body;

electrical transducing means, adapted to be connected to the living body to obtain parameters of the cardiac cycle and the respiratory cycle to be correlated with said analog electrical signal waveform from said pressure transducer means to determine the optimal time during said cardiac and respiratory cycles for analysis of said frequency distribution to achieve the most accurate physiological interpretation of said frequency distribution, said electrical transducing means being connected to said analog to digital converter means; and

output means electrically connected to said computing means for displaying the results of said mathematical analysis.

4,893,631

ACTIVE ELEMENT SELECTION FOR CONTINUOUS BLOOD PRESSURE MONITOR TRANSDUCER

Dennis J. Wenzel; Dean C. Winter, and Kevin S. Honeyager, all of San Antonio, Tex., assignors to Colin Electronics Co., Ltd., Komaki, Japan

Filed Feb. 25, 1988, Ser. No. 160,146
Int. Cl.[4] A61B *5/02*
U.S. Cl. 128—672 **8 Claims**

1. A system for the continuous external measurement of blood pressure in an underlying artery of a subject, including an array of individual pressure sensitive elements, the length of which array exceeds the diameter of the underlying artery, comprising

means for selecting an ordered set Q which includes of said elements ordered with respect to their physical position;

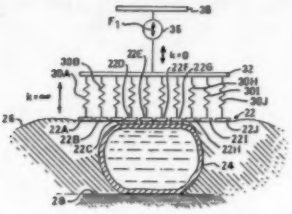
means for selecting a set L of those elements having local minima on a plot of diastolic or systolic pressure versus transducer element number;

means for computing a spatially weighted average of pulse amplitude values from the set Q centered about each element of set L;

means for specifying the number of elements over which

said spatially weighted average of pulse amplitude values is to be computed; and

means for operatively selecting the output of the element



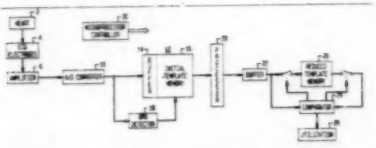
from set L which has the largest spatially weighted average of pulse amplitude values centered about it as the single measurement to represent the blood pressure existing in said underlying artery.

4,893,632

METHOD AND APPARATUS FOR COMPARING WAVEFORM SHAMES OF TIME-VARYING SIGNALS

Robert M. Armington, West Peabody, Mass., assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Apr. 13, 1988, Ser. No. 181,027
Int. Cl.[4] A61B *5/04*
U.S. Cl. 128—696 **15 Claims**



1. A method for comparing sequential waveshape portions of at least one time-varying signal, comprising:

forming sequential initial templates, each initial template consisting of a plurality of digital signal sample values representative of the amplitude of successive time-spaced samples of a respective portion of said time-varying signal;

forming from each of said initial templates a corresponding reduced template having a plurality of digital signal elements which is less in number than the plurality of sample values in its corresponding initial template, each element of said reduced template comprising a combination of at least two sample values from its corresponding initial template; and

processing correspondingly positioned elements of at least two of said reduced templates for deriving a comparison signal representative of the degree of similarity of the respective portions of said time-varying signal represented by said at least two reduced templates.

4,893,633

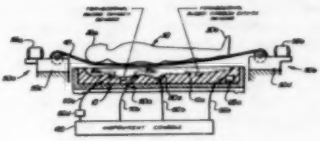
METHOD OF TEMPERATURE MEASUREMENT

Arnold St. J. Lee, 2008 Cotner Ave., Los Angeles, Calif. 90025

Continuation of Ser. No. 73,633, Jul. 15, 1987, abandoned, which is a division of Ser. No. 786,746, Oct. 11, 1985, Pat. No. 4,681,098. This application Oct. 24, 1988, Ser. No. 261,257
Int. Cl.[4] A61B *5/00*
U.S. Cl. 128—736 **3 Claims**

1. A method for measuring the temperature of a part of a subject's body comprising the steps of:

placing the subject's body in a supine position in a substantially rigid body mold having an impression intimately matching the entire length of the dorsal half of the subject's body and having a temperature transducer which produces a voltage output representative of temperature



embedded therein whereby the subject's body comes into contact with said transducer; and

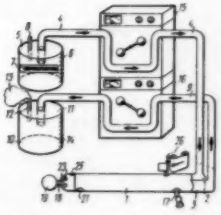
recording the voltage output of the temperature transducer to provide a measurement of the subject's temperature.

4,893,634

DEVICE FOR CLEANSING MEASURING PRESSURE IN THE COLON

Yaroslav P. Kulik, and Alexei A. Malaev, both of Blagoveschensk Amurskoi, U.S.S.R., assignors to Problamnaya Nauchno-Issledovatelskaya Laboratoria Vspomogatelnogo Krovoobraschenia, Blagoveschensk, U.S.S.R.

Filed Jul. 27, 1987, Ser. No. 77,895
Int. Cl.[4] A61B *5/10*
U.S. Cl. 128—748 **4 Claims**



1. A device for cleansing the colon, comprising:

a cylinder-shaped housing made of an elastic material;

working end of said housing;

a discharge channel in said housing;

ports of said discharge channel in said housing end adapted for delivering a lavation solution into the colon;

an aspiration channel in said housing, isolated from said discharge channel;

ports of said aspiration channel in said housing end adapted for receiving the contents of said colon washed out by said lavation solution;

a reservoir for said lavation solution;

a first piping communicating said reservoir for the lavation solution with said discharge channel;

a receptacle for accepting the contents of said color washed out by said lavation solution;

a second piping which establishes communication between said receptacle and said aspiration channel;

an endoscope accommodated in said aspiration channel and having a working portion brought outwards from said channel through an opening in said housing working end;

an expandable transparent balloon provided on said working portion of said endoscope extending through and out of

said aspiration channel through an opening in said working end of said housing;

means for expanding said balloon after it has been introduced into the colon to achieve effective pressurization and sealing in the area of contact between the walls of the balloon and the colon walls;

a tube means extending in said discharge channel for transmitting the pressure in the colon, one end of said tube means extending out of said working end of said housing and the other end of said tube means extending out of a proximal end of said housing for connection to a pressure measuring means; and

means for adjusting the pressure head and the suction head in said respective first and second pipings.

4,893,635

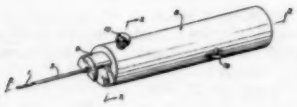
APPARATUS FOR PERFORMING A BIOPSY

William J. de Groot, #1 Cedar Lawn South, Galveston, Tex. 77550; Theodore J. de Groot, 53 Lafayette St., Norwich, Conn. 06360, and Joseph B. de Groot, 50 Morshapa Rd., Centerport, L.I., N.Y. 11721

Division of Ser. No. 918,927, Oct. 15, 1986, Pat. No. 4,766,907. This application Jun. 1, 1988, Ser. No. 200,859

Int. Cl.[4] A61B *10/00*

U.S. Cl. 128—754 **3 Claims**



1. Non-aspiration apparatus for obtaining cells in lung tissue while performing a percutaneous biopsy on a patient comprising, a relatively long thin cannula needle in the range of 18 to 21 gauge having an angled shape cutting tip, a cell retrieving instrument slidably mounted in said needle, a syringe assembly, said syringe assembly including a cylinder portion and a plunger portion slidably mounted in said cylinder portion, one end of said needle being connected to the syringe cylinder portion, and wire means connecting the cell retrieving instrument to the syringe plunger portion, whereby cells are obtained from the patient's lung by inserting the needle, with the cell retrieving instrument wholly contained therein, inwardly through the patient's chest into the lung, maintaining the cell retrieving instrument fixed while sliding the needle outwardly relative thereto, to thereby expose the cell retrieving instrument within the patient's lung, maintaining the needle fixed while sliding the cell retrieving instrument in an outward direction into the needle, and removing the needle, the wholly contained instrument and retrieved cell from the patient's lung.

4,893,636

MEDICAL CONTAINER STOPPER

Boyce W. Cook, Deland, Fla., and William R. Fiehler, St. Louis, Mo., assignors to Sherwood Medical Company, St. Louis, Mo.

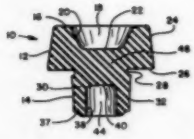
Filed Mar. 9, 1988, Ser. No. 165,806

Int. Cl.[4] A61M *5/18*

U.S. Cl. 128—764 **8 Claims**

1. In combination, a tube having an opening, a stopper for closing the opening in said tube, and a holder for said tube and stopper, comprising:

a holder body closed at one end and open at an opposite end with an axially extending hollow needle positioned therein such that one end of said needle extends into said holder body toward said opening and an opposite end of said needle extends outside said holder body, a hollow elongated blood collection tube having a tubular side wall portion terminating at one end of said tube in a closed end wall portion and having a round in diameter open end opposite the closed end wall portion of said tube, a stopper body having round and connected flange and plug portions, the flange portion of said stopper body being substantially larger in diameter than the plug portion of said stopper body and sized to be slidably moved into the holder body and against the needle end extending into said



holder body, the largest diameter of the flange portion of said stopper body exceeding the largest diameter of the sidewall portion of said tube proximate the opening in said tube by a factor of at least 1.4 and, means forming aligned and opposed cavities in the flange and plug portions defining a relatively thin diaphragm portion therebetween.

4,893,637

APPARATUS AND METHODS FOR MAKING COMPONENTS OF A SMOKING ARTICLE

Lloyd H. Hancock, Walnut Cove; Jesse A. Stigall, King, and Donald R. Wilkinson, Clemmons, all of N.C., assignors to R. J. Reynolds Tobacco Co., Winston-Salem, N.C.

Filed Sep. 15, 1987, Ser. No. 97,240

Int. Cl.[4] A24C *5/00, 5/18*

U.S. Cl. 131—280 **35 Claims**

1. A device for forming a composite member for use in making a smoking article, the composite member comprising a removable support member circumscribed by a layer of compressible and resilient material, the device comprising (a) an elongate structure having a curved inner surface that tapers from a larger proximal end to a smaller distal end, the proximal end of the structure being adapted to receive the support member and the layer of material which are fed simultaneously into the device, the tapering inward curved inner surface causing the longitudinal edges of the layer of material to bend around the inner support member, and (b) a curved forming surface that causes a first longitudinal edge of the material to fold over the support member while permitting the second longitudinal edge to pass by the forming surface, the curved inner surface of the device further tapering to the distal end causing the longitudinal second edge of the material to fold over the support member proximate to the first longitudinal edge.

4,893,638

CIGARETTE

John H. Lauterbach, Louisville, Ky., assignor to Brown & Williamson Tobacco Corporation, Louisville, Ky.

Filed Dec. 9, 1988, Ser. No. 281,599

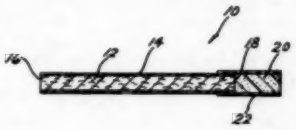
Int. Cl.[4] A24D *1/00*; A24B *1/00*

U.S. Cl. 131—364 **4 Claims**

1. A cigarette comprising:

a tobacco column consisting of ground tobacco with a particle size in the range of about 0.5 mm to about 3.0 mm, said tobacco column having a circumference of from about 10

mm to about 19 mm and a packing density in the range of approximately 350 g/cm^3 to 450 mg/cm^3; and,



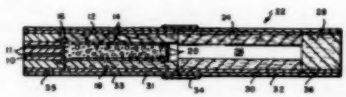
a circumscribing wrapper of combustible paper circumscribing said tobacco column.

4,893,639

DENSIFIED PARTICULATE MATERIALS FOR SMOKING PRODUCTS AND PROCESS FOR PREPARING THE SAME

Jackie L. White, Pfafftown, N.C., assignor to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed Jul. 22, 1986, Ser. No. 888,534
Int. Cl.[4] A24C *15/18*; A24D *1/18*
U.S. Cl. 131—369 13 Claims



1. A process for preparing densified particulate materials suitable for use in smoking products, which process comprises the sequential steps of:

(a) forming an extrudable mixture comprising a suitable solvent and a solid selected from the group consisting of carbon, tobacco, and mixtures thereof;

(b) extruding said mixture into rod-type members;

(c) feeding said rod-type members to a centrifugal granulation apparatus; and

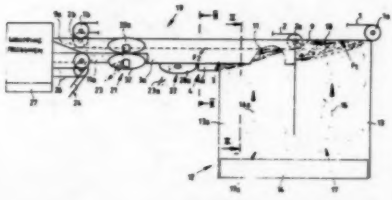
(d) subjecting said rod-type members to sufficient centrifugal force in said granulation apparatus for a sufficient period of time to increase their density by at least 20 percent.

4,893,640

MULTIPLE-ROD CIGARETTE MAKING MACHINE

Uwe Heitmann, and Manfred Goldbach, both of Hamburg, Fed. Rep. of Germany, assignors to Körber AG, Hamburg, Fed. Rep. of Germany

Filed Nov. 22, 1988, Ser. No. 275,078
Claims priority, application Fed. Rep. of Germany, Dec. 12, 1987, 3742251
Int. Cl.[4] A24C *5/18*, *5/31*
U.S. Cl. 131—84.4 13 Claims



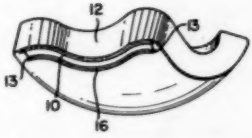
1. Machine for simultaneously producing a plurality of rods which contain a fibrous material of the tobacco processing industry, comprising first and second conveyors defining elongated paths; means for supplying fibrous material into first portions of said paths so that the first and second conveyors accumulate and advance along the respective paths discrete first and second streams each of which contains a surplus of fibrous material; and discrete first and second surplus removing apparatus adjacent second portions of the respective paths downstream of said supplying means, each of said apparatus comprising a pair of substantially coplanar rotary trimming discs, the trimming discs of said first apparatus being disposed in a first plane and the trimming discs of said second apparatus being disposed in a different second plane.

4,893,641

FLEXIBLE RAZOR, METHOD OF USE

Edward Strickland, 2500 Kalakua Ave., Apt. 502, Honolulu, Hi. 96815

Continuation-in-part of Ser. No. 172,258, Mar. 23, 1988, Pat. No. 4,845,848. This application May 5, 1989, Ser. No. 347,582
Int. Cl.[4] B26B *19/44*
U.S. Cl. 132—200 8 Claims



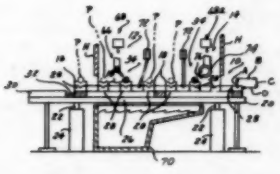
1. A method for shaving hairs from the surface of the skin with a razor means in the form of flexible razor blade fixed to a flexible support member by manually manipulating said razor means comprising pressing the blade against the skin while moving said blade over the skin, apply said pressure to the back side of the support member by contact with one or the other of the thumb and fingers of the manipulator, and using said pressure for flexing the blade to follow the changing contour of the surface being shaved.

4,893,642

PRODUCTION LINE PART DEBURRING APPARATUS

Harold W. Parslow, Jr., and Timothy M. Parslow, both of Mt. Clemens, Mich., assignors to GraPar Corporation, Warren, Mich.

Filed Jan. 11, 1989, Ser. No. 296,189
Int. Cl.[4] B08B *3/02*
U.S. Cl. 134—66 16 Claims



1. An apparatus for production line deburring of like parts, each part having an established axis of rotation and opposite ends said apparatus comprising:

conveying means for advancing the parts in succession in intermittent step-by-step movement along a fixed path;

part rotating means mounted at a first location on said path for supportingly engaging the opposite ends of a part on said conveying means and for driving the engaged part in high speed rotation about said established axis of rotation; and

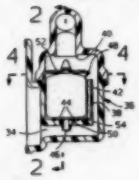
deburring means adjacent said first location for spraying a high pressure fluid against said part while said part is driven in high speed rotation by said part rotating means to remove microburrs and flashings from said part by a combination of centrifugal forces produced by the high speed rotation and impingement forces produced by the high pressure fluid.

4,893,643

TANK VAPOR VENT VALVE ASSEMBLY WITH IMPROVED OVERFILL PROTECTION

William E. Gifford, Hemlock; Carl H. Sherwood, Brockport; Charles H. Covert, Manchester, and Kenneth W. Turner, Webster, all of N.Y., assignors to General Motors Corporation, Detroit, Mich.

Filed Feb. 27, 1989, Ser. No. 316,001
Int. Cl.[4] B01D *53/04*
U.S. Cl. 137—202 **3 Claims**



1. In a vehicle fuel tank vapor recovery system of the type that has a vapor storage canister and a tank vapor vent valve assembly that routes the flow of fuel vapor displaced from the fuel tank during fuel fill to said canister, but which blocks liquid fuel from reaching said canister, the improvement comprising,

a lightweight and buoyant float with an elongated axis having a seal at its upper end,

a float chamber through which said flow of displaced tank vapor passes, said chamber having an interior wall within which said float is slidably received so as to move up and down along its axis, said interior wall having an inner surface that forms a thin envelope of space about said float while leaving said float upper end free, said interior wall also having an outer surface that is exposed to said flow of displaced tank vapor,

a pressure tube extending through said float chamber interior wall so as to open at its inner end into said space envelope and at its outer end into said flow, and,

a vapor vent line running from said canister to said float chamber and opening through said float chamber above said float seal,

whereby, during fuel fill, as displaced tank vapor flows through said float chamber and past said pressure tube outer end, a negative pressure is created in said envelope of space that serves to keep said float down, and should liquid fuel reach said float chamber, it will flow into said envelope of space and around said float, buoying it freely up along its axis until its seal blocks said vapor vent line.

4,893,644

NON-RETURN VALVE FOR SUPPLY COCKS

Marco Giacomini, Novara, Italy, assignor to Sirio S.p.A., Italy

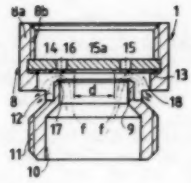
Filed Aug. 31, 1988, Ser. No. 239,134
Claims priority, application Italy, Sep. 4, 1987, 21799 A/87
Int. Cl.[4] F16K *24/00*
U.S. Cl. 137—218 **14 Claims**

1. A non-return valve for water supply cocks, comprising:

(a) a one-piece, elongated, tubular, valve body having a cup-shaped portion at an inlet end and an integral base at an opposite outlet end, said cup-shaped portion having an interiorly threaded section for connection to a water supply cock, said base having an exteriorly threaded section for connection to a hose coupling, said base and cup-shaped portion bounding a passage along which water from the inlet end flows in one direction to the outlet end, said base and cup-shaped portion bounding therebetween a bypass channel open to the exterior of the valve;

(b) a substantially rigid washer separate from, and mounted within, the cup-shaped portion and having one surface for sealing engagement with the cock, an opposite surface, and apertures extending through the washer surfaces; and

(c) a flexible annular membrane mounted within the cup-shaped portion adjacent the washer, said membrane having an outer peripheral section stationarily mounted in a fixed position by the washer, and an inner movable valve portion having a central hole, said valve portion being movable from an open position in which the valve portion is positioned by water flowing along said one direction away from the washer and permits water to flow along the passage through the apertures and the central hole to the outlet end, to a closed position in which the valve portion is positioned against the washer and blocks the apertures, thereby routing return water flowing in the return direction opposite to said one direction into the bypass channel to the valve exterior.

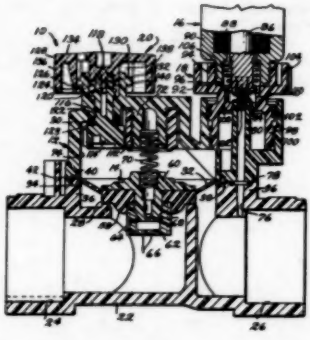


4,893,645

CONTROL VALVE WITH IMPROVED DUAL MODE OPERATION AND FLOW ADJUSTMENT

Andrius R. Augustinas, Peoria, Ill., and Raymond F. Lippitt, Bethesda, Md., assignors to L. R. Nelson Corporation, Peoria, Ill.

Filed Nov. 7, 1988, Ser. No. 267,567
Int. Cl.[4] F16K *43/00, 31/385, 31/40*
U.S. Cl. 137—315 **23 Claims**



22. A control valve comprising

a valve body having an inlet for receiving water under pressure, an outlet, a main valve seat communicating between said inlet and said outlet and a first flanged annu-

lar mounting portion surrounding said main valve seat providing a first annular diaphragm edge receiving surface means,

a main valve mounted in said valve body structure for movement between an engaged position with respect to said main valve seat preventing communication of said inlet with said outlet through said main valve seat and a spaced position with respect to said main valve seat allowing communication of said inlet with said outlet through said main valve seat,

said main valve having a diaphragm connected therewith and extending outwardly therefrom,

a valve bonnet having a second flanged annular mounted portion providing a second annular diaphragm edge receiving surface means

means for removably securing said valve bonnet on said valve body with a marginal edge of said diaphragm engaged between the first and second flanged annular diaphragm edge receiving surface means so that said diaphragm defines with said valve bonnet a control chamber,

pressure control means operatively associated with said control chamber and said inlet and outlet for (1) utilizing the water under pressure communicating with said inlet to create sufficient water pressure in said control chamber to maintain said main valve in said engaged position and (2) for discharging water under pressure from said control chamber to said outlet to reduce the water pressure in said control chamber sufficient to enable said main valve to move into said spaced position,

said control means comprising control passage means from said control chamber to said outlet having a control valve seat therein,

a solenoid assembly including a control plunger spring biased toward an extended position and a solenoid coil means energizable to retract said control plunger from said extended position against the spring bias thereof into a spaced retracted position,

means mounting said solenoid assembly on said bonnet in a solenoid operating position wherein said control plunger is (1) spring biased to engage said control valve seat when in an intermediate position between said extended and retracted positions so as to prevent communication of said control chamber with said outlet through said control passage means and (2) retractable from said intermediate position by the energization of said solenoid coil means to permit communication of said control chamber with said outlet through said control passage means, and

an adjusting mechanism carried by said bonnet for manual movement into selected positions for selectively varying the distance between said main valve and said main valve seat when said main valve is in said spaced position,

said bonnet mounting means comprising:

said first flanged annular mounting portion having a series of annularly spaced threaded bores formed therein,

a series of headed bolts threaded into said threaded bores,

the second flanged annular mounting portion of said bonnet having a series of flange sections corresponding with the series of bolts,

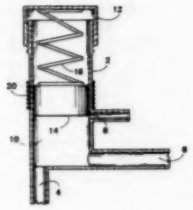
said flange sections including bolt receiving slots having open ends opening in the same annular direction and being shaped to enable said bonnet to be moved (1) from a separated condition in a direction toward said valve body into a preliminary position of cooperation between said first and second annular diaphragm receiving surface means wherein said bolt are disposed adjacent the open ends of said slots and (2) from said preliminary position in an annular direction into an operating position wherein said bolts are disposed in said slots in positions to be tightened onto the associated flange sections.

4,893,646

FLUID PRESSURE REGULATOR

Guenther W. Wimmer, Portland, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Apr. 28, 1988, Ser. No. 187,666
Int. Cl.[4] G05D *16/20*
U.S. Cl. 137—487.5 **8 Claims**



1. A fluid pressure regulator comprising:

a housing defining a cylindrical chamber, an inlet opening for introducing fluid into the chamber, an outlet opening for allowing fluid to leave the chamber, the outlet opening being in open communication with the inlet opening, and a bleed orifice in communication with a space at constant pressure,

a source of fluid under pressure connected to the inlet opening,

a piston member of ferromagnetic material fitted in the chamber and slidable therein within a range of positions such that the bleed orifice is partially covered by the piston member, and

magnetic means which bias the piston member at a substantially constant force when it is within said range of positions, the magnetic means comprising an electrical conductor having first and second opposite terminals and a current source connected to said terminals for supplying a flow of current through the conductor.

4,893,647

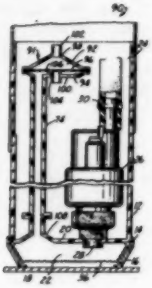
IN-TANK FUEL RESERVOIR WITH RESERVOIR FUEL LEVEL CONTROL

Charles H. Tuckey, Cass City, Mich., assignor to Walbro Corporation, Cass City, Mich.

Division of Ser. No. 153,316, Feb. 8, 1988, Pat. No. 4,831,990, which is a continuation-in-part of Ser. No. 49,537, May 14, 1987, Pat. No. 4,807,582, which is a continuation-in-part of Ser. No. 928,184, Nov. 7, 1986, Pat. No. 4,747,388. This application Feb. 24, 1989, Ser. No. 314,878
The portion of the term of this patent subsequent to Feb. 28, 2006, has been disclaimed.
Int. Cl.[4] F16K *17/19*; F02M *37/10*
U.S. Cl. 137—493 **4 Claims**

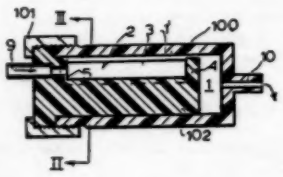
1. A fuel delivery system for automobile engines and the like comprising: a canister for positioning within a fuel tank and having a lower end with an opening in communication with said fuel tank and an internal wall spaced from said lower end dividing said canister into upper and lower chambers, an electric fuel pump positioned within said canister having an inlet coupled to draw fuel solely from said lower chamber through said internal wall and an outlet for delivering fuel under pressure, means for returning excess fuel to said upper chamber, and means responsive to fuel level in said upper chamber for selectively feeding fuel from said upper chamber to said lower chamber when fuel level in said upper chamber approaches maximum capacity of said upper chamber, said level responsive means comprising passage means in said internal wall and

a standpipe extending from said passage to an upper end at a position corresponding to maximum capacity fuel level in said



upper chamber, and further comprising pressure valve means carried at said upper end of said standpipe.

4,893,648
CONTROL VALVE
Eduard Horvath, Vienna, Austria, assignor to Otto Bock Orthopedische Industrie Besitz - und Verwaltungs - KG, Duderstadt, Fed. Rep. of Germany
Filed Sep. 30, 1988, Ser. No. 252,859
Claims priority, application Austria, Oct. 2, 1987, 2511/87
Int. Cl.[4] G05D *7/01*
U.S. Cl. 137—504 **14 Claims**



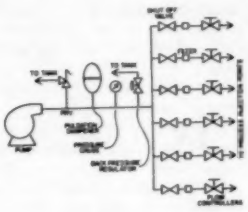
1. A control valve for the control of a liquid flow, especially to a hydraulic piston-and-cylinder damper, said control valve comprising:

an elongated housing having an axis, formed with a generally cylindrical wall over at least a portion of the periphery thereof and provided with an outlet at one end of said housing;

means in said housing formed with a pair of substantially parallel flexible lamellar-like walls extending parallel to generatrices of said cylindrical wall and reaching toward said cylindrical wall, a first end wall proximal to said end of said housing, and another end wall remote from said end of said housing, said lamellar-like walls and said end walls defining a trough-shaped pressure chamber in said member opening toward said cylindrical wall with said lamellar-like walls and said first end wall defining a throttle gap between said pressure chamber and said outlet decreasing in flow cross section as fluid pressure in said chamber increases as a result of outward deflection of said lamellar-like walls; and

means for feeding said liquid flow to said chamber.

4,893,649
CONSTANT FLOW RATE CONTROLLER VALVE
Paul K. Skoglund, P.O. Box 968, Woodinville, Wash. 98072
Filed Sep. 30, 1988, Ser. No. 251,920
Int. Cl.[4] G05D *7/01*
U.S. Cl. 137—504 **8 Claims**



1. A valve mechanism for regulating gas or fluid flow comprising:

a housing having an inlet and outlet forming a flow passage through said housing;

a piston mounted in a bore formed in said flow passage, said piston intersecting said flow passage, said piston dividing a portion of said flow passage into first and second chambers located at opposite sides of said piston and respectively communicating with said inlet and outlet;

an orifice through said piston, said orifice connecting said first and second chambers, said orifice calibrated for a predetermined flow rate and being the sole gas or fluid flow passage from said inlet to said outlet;

a valve stem connected with said piston for movement therewith by a first spring means, said valve stem having a small surface area in relation to the surface area of said piston;

a valve seat between said piston and said outlet, said valve seat aligned to seat and unseat said valve stem based on the relative position of said piston within said housing;

a second spring means biasing said piston toward said inlet, said spring means providing a bias force that establishes a substantially constant pressure differential between said first chamber and said second chamber to enable a substantially constant outlet flow at varied pressures without substantial movement of said piston after flow is initiated; and,

a screw adjustment means in contact with said valve seat, said valve seat being variable in position within said housing based upon adjustment of said screw adjustment means.

4,893,650
ONE WAY HIGH PRESSURE FLOW CONTROL FITTINGS
Bill Chisholm, 10 Coachway Rd., S.W., Apt. #171, Calgary, Alberta, Canada (T3H 1E5), and Roger E. Frei, Box 8, Site 12, RR #9, Calgary, Alberta, Canada T2J 5G5
Filed Sep. 12, 1988, Ser. No. 242,495
Int. Cl.[4] F16K *15/04*
U.S. Cl. 137—539 **3 Claims**

1. A fitting adapted to be installed upon an apparatus to at least temporarily provide one way fluid flow communication from a source of lubricant, bridging agents, or grease having an output pressure in the order of 10,000 PSI, said fitting comprising:

a flow channel for conducting substances interiorly through said fitting, said flow channel comprising coaxial inlet and outlet passageways, the outlet passageway having a diameter substantially greater than the input passageway;

a valve seat disposed between said inlet passageway and said outlet passageway for selectively permitting fluid flow

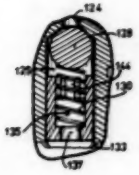
communication between said inlet and outlet passageways;

a ball valve disposed within said outlet passageway for selectively blocking said valve seat, said ball valve having a diameter greater than the diameter of said inlet passageway but smaller than the diameter of said outlet passageway;

a spring disposed within said outlet passageway for normally yieldably biasing said ball valve into blocking contact with said valve seat;

a rigid, castellated cage disposed within said outlet passageway at the bottom of said fitting for controlling said spring during fluid flow to prevent spring deformation and cylinderization and for limiting travel of said ball valve, thereby positively insuring flow through said fitting, said cage comprising:

a generally cylindrical passageway coaxial with said flow



channel and coaxially containing and seating said spring, said cylindrical passageway forming a fluid exit from said fitting;

a plurality of upwardly extending legs symmetrically radially spaced apart about said cylindrical passageway and said spring for limiting axial displacement of said ball valve to prevent cylinderization and for centering said ball valve to prevent spring twisting and bending; and,

a plurality of radially spaced apart relief slots defined between adjacent legs providing fluid flow communication to said cylindrical passageway about the periphery of said ball valve;

whereby positive one way flow is maintained through said valve orifice, around said ball valve, through said slots, between exposed adjacent spring windings, through the hollow interior of the spring partially compressed within said cage, and out through said fluid exit.

4,893,651

SELF-VENTING DRAIN VALUE ASSEMBLY

Peter K. Herman, Cookeville, Tenn.; Jean Y. Bouchet, Quimper, and Daniel Fertil, Plogonnec, both of France, assignors to Cummins Engine Company, Inc., Columbus, Ind.

Filed Jan. 6, 1989, Ser. No. 293,964

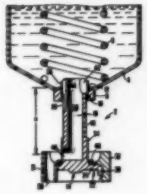
Int. Cl.[4] F16K *24/00*

U.S. Cl. 137—588 **51 Claims**

1. A self-venting valve assembly for draining liquid from a vessel, comprising:

a body portion containing an opening through which liquid may drain and gas may simultaneously enter the vessel; and

a valve means for selectively permitting and preventing flow through said opening, said valve means being positioned for reciprocating movement within said opening between a closed position in which the liquid and gas movement through said opening is prevented and an open position in which gas entry and a liquid drainage occur along separate fluid paths formed in said valve means, said valve means comprising a stem containing at least one groove formed in the exterior surface of said stem, said stem and said body cooperating to form one of said fluid paths through said groove wherein an upper portion of said



groove remains in said vessel while said valve means is in said open position.

4,893,652

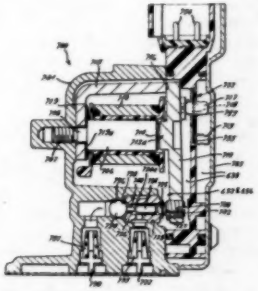
DIRECT-ACTING, NON-CLOSE CLEARANCE SOLENOID-ACTUATED VALVES

Thomas D. Nogle, Troy, and James R. Klotz, Mt. Clemens, both of Mich., assignors to Chrysler Motors Corporation, Highland Park, Mich.

Filed Apr. 29, 1988, Ser. No. 188,598

Int. Cl.[4] F15B *13/044*

U.S. Cl. 137—596.17 **14 Claims**



1. A valve assembly for controlling fluid flow between a fluid supply source and fluid actuating device in a vehicle transmission, said assembly comprising:

means forming a housing having a supply port for connection with a fluid supply source, an element port for connection with the fluid actuating device, and a passageway communicating with said supply port and said element port;

a ball disposed within said passageway and moveable between positions which cause said element port to be either connected to said supply port or a vent port;

means forming a plunger having a longitudinal axis aligned with the center of said ball to move said ball;

electromagnetic means for producing a magnetic field when electrically energized; and

armature means moveable in response to the presence and absence of a magnetic field for actuating said plunger means, said armature means comprising an armature member axially spaced from the electromagnetic means and extending outwardly in a plane perpendicular to an axial length of the electromagnetic means and having an offset portion extending toward and at least partially disposed inside the electromagnetic means to cause a working air gap between the armature means and electromagnetic means to be disposed inside and offset toward the center of the electromagnetic means for more efficient magnetic

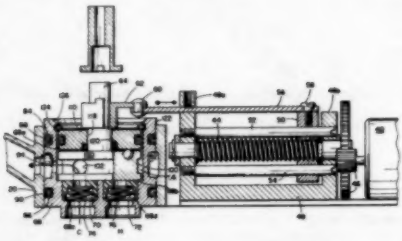
flow, wherein said armature member has one end spaced transversely from said offset portion for actuating said plunger means to move said ball.

4,893,653

ELECTRICALLY CONTROLLED FAUCET

Joseph T. Ferrigno, 151-45 27th Ave., Flushing, N.Y. 11354

Filed Jan. 4, 1989, Ser. No. 293,214
Int. Cl.[4] F16K *11/24*
U.S. Cl. 137—607 16 Claims



1. An electrically controlled faucet comprising, in combination:

a main body having a cylindrical bore and a pair of inlets at one end for inflow of fluids of two different temperatures, and an external circumferential passage to which a fluid of one temperature or a mixture of the two different temperature fluids discharges through an opening communicating the bore with the circumferential passage;

a circular disk-shaped mixing valve having top and bottom surfaces supported for limited rotation in the bore of said main body, said valve having a circumferential fluid passage formed in its external surface intermediate its top and bottom surfaces, and first and second input ports extending upwardly from the bottom surface and communicating with the circumferential passage, said first and second input ports being angularly spaced relative to the inlets in said main body so that in a first rotational position of said valve only fluid from one of said inlets flows through said first input port to said circumferential passage, in a second rotational position only fluid from the other of said inlets flows through said second input port to said circumferential passage, in a third rotational position fluids from both of said inlets flow through respective first and second input ports to said circumferential passage, and in a fourth rotational position there is no fluid flow from either of said inlets;

a cylindrical outer shell surrounding said main body in sealing rotational relationship therewith, said outer shell having an outspout through which fluid discharges from the external circumferential fluid passage of said main body; and

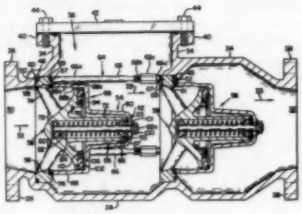
circuit means including a first reversible DC motor mechanically coupled to said mixing valve and operative when energized to rotate said valve, a source of DC potential, and switch means including at least first, second and third manually-actuable switches each having a pair of contactors connected to said source of DC potential and a pair of contacts selectably connectable to respective terminals of said first motor through a respective wafer-type switch having stationary contacts and relatively rotatable contacts mechanically coupled to said mixing valve for rotation therewith for controlling application of DC potential to said first motor in dependence on actuation of a selected one of said first, second or third manually-actuable switches for rotating said mixing valve to a corresponding one of said first, second or third rotational positions thereby to discharge fluid from said outspout at one or the other of said different inlet temperatures or a predetermined blend of said inlet temperatures.

4,893,654

DOUBLE CHECK VALVE BACKFLOW PREVENTER ASSEMBLY

John G. Feuz, 10595 SE. Hillcrest, Portland, Oreg. 97266

Filed Jul. 8, 1988, Ser. No. 216,857
Int. Cl.[4] F16K *15/00*
U.S. Cl. 137—614.2 15 Claims



1. A double check valve backflow preventer assembly for installation in a liquid supply line in a space of predetermined length dimension between a pair of gate valve assemblies normally occupied by a single check valve backflow preventer assembly, said double check valve backflow preventer assembly comprising:

a single unitary valve body having substantially said predetermined length dimension and opposite end coupling means for coupling to corresponding coupling means of said gate valve assemblies and defining opposite end liquid inlet and outlet openings;

said valve body defining a single access opening between said opposite end inlet and outlet openings and a removable access cover for closing said access opening,

a first annular valve seat within said valve body on the inlet side of said access opening,

a second annular valve seat within said valve body on the outlet side of said access opening,

a first check valve assembly for mounting within said valve body to open in a downstream direction with respect to said inlet and outlet openings and including a first stationary valve cage having a ring for seating against said first valve seat,

a second check valve assembly for mounting within said valve body to open in a downstream direction with respect to said inlet and outlet openings and including a second stationary valve cage having a ring for seating against said second valve seat,

and releasable seating means operable to seat said first valve cage ring against said first valve seat and said second valve cage ring against said second valve seat, said seating means being operable to seat and release said cage rings from their seated engagement with said valve seats through said single access opening.

4,893,655

DOUBLE VALVE MECHANISM FOR AN ACOUSTIC MODULATOR

Robert B. Anderson, Stanford, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 23, 1989, Ser. No. 397,549
Int. Cl.[4] F16K *31/08, 3/26*; H04R *9/00*
U.S. Cl. 137—625.33 10 Claims

1. A valve mechanism for an acoustic modulator comprising: first and second cylindrical shaped members with said first

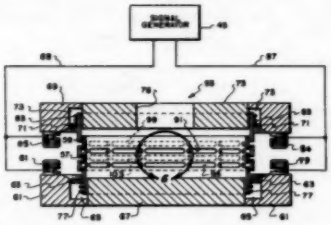
cylindrical shaped member being positioned inside of said second cylindrical shaped member;

first and second support members;

said first cylindrical shaped member having at least a first plurality of ports located in a plane near the upper end thereof, and a second plurality of ports located in a plane below said first plurality of ports;

said second cylindrical shaped member having at least a first plurality of ports located in a plane near the lower end thereof, and a second plurality of ports located in a plane above said first plurality of ports;

spring means connecting said first cylindrical shaped member to said first support member and said second cylindrical shaped member to said second support member;



first and second driver means, said first driver means being positioned near the lower end of said first cylindrical shaped member and said second driver means being positioned near the upper end of said second cylindrical shaped member; and

said first and second driver means being excited by an electrical sinusoidal input signal so as to cause movement of said first and second cylindrical shaped members thereby obstructing or permitting the passage of air through the ports of said first and second cylindrical shaped members such that the pulse shape of an acoustic energy output waveform provided by said valve mechanism is full-wave rectified and has a frequency twice the frequency of said electrical sinusoidal input signal.

4,893,656

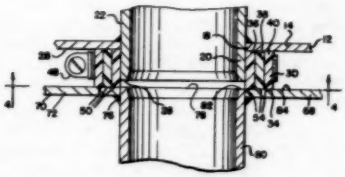
DIVERTER VALVE

Walter Willhoft, P.O. Box 95, Wasco, Ill. 60183

Filed Jan. 30, 1989, Ser. No. 303,807

Int. Cl.[4] F16K *11/02*

U.S. Cl. 137—874 **10 Claims**



1. A diverter-type valve comprising:

a valve body,

a first and a second discharge tube having inlet ends carried by said body,

a movable member pivotally attached to said valve body by a pair of spaced apart link bars,

an intake tube having an outlet end carried by said movable member,

operative means attached to said movable member to selectively swing said movable member to align said intake tube outlet end with either said first or second discharge tube inlet end, and

gasket means positioned about said aligned intake tube outlet end and said discharge tube inlet end, said means having a sealing surface forming a series of arcuate shaped seals to inhibit egress from or ingress into said aligned ends,

wherein material may flow through said valve in a leak resistant and contaminant resistant manner.

4,893,657

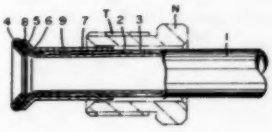
STRUCTURE OF THE CONNECTING END PORTION OF COMPOSITE TUBE HAVING SMALL DIAMETER

Masayoshi Usui, Numazu, Japan, assignor to Usui Kokusai Sangyo Kabushiki Kaisha, Shizuoka Prefecture, Japan

Continuation of Ser. No. 125,556, Nov. 25, 1987, abandoned. This application Jan. 25, 1989, Ser. No. 301,659

Int. Cl.[4] F16L *35/00*

U.S. Cl. 138—109 **6 Claims**



1. A reconnectable structure of a connecting end portion of a small diameter composite tube consisting of a thin metal tube having a small diameter and a resin tube closely fitted on the outer periphery of said metal tube and extending substantially along the entire length thereof, the metal and resin tubes being substantially cylindrical and of uniform respective thicknesses adjacent the connecting end portion, said connecting end portion having a coaxial and outwardly opening flare which is formed integrally with said composite tube and with the metal and resin tube portions along said outwardly opening flare being of uniform respective thickness, characterized by the inclusion of:

a metal sleeve washer having a uniform radial thickness substantially equal to the thickness of the metal tube fitted on the outer periphery of said composite tube, said metal sleeve washer and said thin metal tube being formed from the same metal material, said metal sleeve washer having substantially the same shape as that of said composite tube with said flare and comprising a trumpet-like open wall which is contacted with the outer surface of said flare, and a cylindrical wall fitted on the outer periphery of the cylindrical portion of said composite tube adjacent to said flare, a nut having a central cylindrical through aperture surrounding the cylindrical wall of the metal sleeve washer, said nut having a flared entry to said through aperture, said flared entry conforming to the shape of and engaging the trumpet-like wall of said metal sleeve washer, whereby said metal sleeve washer prevents friction related damage to the resin tube and further increases the strength of the connecting end portion thereby reducing torsional stress and preventing breakage such that said metal sleeve washer increases the life and enables reuse of said structure.

4,893,658

FRP PIPE WITH THREADED ENDS

Kunitoshi Kimura, Osaka; Tetsuzo Arai, Takarazuka; Hiroshi Matsuoka, Tsu, and Toshiharu Nakagawa, Suzuka, all of Japan, assignors to Sumitomo Metal Industries, Ltd. and Nitto Electric Industrial Company, Ltd., both of Osaka, Japan

Filed May 26, 1988, Ser. No. 199,923
Claims priority, application Japan, May 27, 1987, 62-130586
Int. Cl.[4] F16L 9/14
U.S. Cl. 138—109 20 Claims

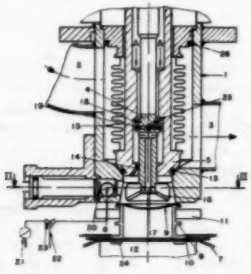
1. An oil well FRP pipe having threaded surfaces at both ends thereof, the pipe including means comprising a metal plating formed on the surface of at least one of the threaded ends for preventing bonding of thread compound thereto.

4,893,659

FILLING HEAD APPARATUS FOR ASEPTICALLY FILLING A PACK

Willi Löliger, Konolfingen, Switzerland, assignor to Nestec S. A., Vevey, Switzerland

Filed Feb. 18, 1988, Ser. No. 157,383
Claims priority, application Switzerland, Mar. 2, 1987, 785/87
Int. Cl.[4] B65B 43/42
U.S. Cl. 141—85 7 Claims



1. A filling head apparatus for aseptically filling a pack comprising:

an elongated housing having a fluid inlet port and a fluid outlet port in the housing sides and having one end defining a filling head space and a second end having a sterilizing medium entry port;

a first elongated valve for regulating flow of a sterilizing medium selected from a group consisting of steam and sterile air for sterilizing the filling head space, the first valve being elongated parallel with the elongation of the housing and being centrally disposed within the housing, the first valve being displaceable along its longitudinal axis;

a second elongated valve for regulating flow of fluid from the housing fluid inlet port to the filling head space, the second valve circumscribing and being displaced from the first valve thereby defining a first passage disposed between the second valve and the first valve which communicates with the sterilizing medium entry port for allowing the sterilizing medium to flow in the first passage between the second valve and the first valve, and being displaceable coaxially with respect to the first valve, the second valve further being displaced from the housing thereby defining a second passage disposed between the second valve and the housing for allowing fluid from the housing inlet to flow in the second passage between the second valve and the housing to the filling head space;

an emptying pipe connected laterally to the housing at the filling head space for removal of sterilizing medium and residual fluid from the filling head space;

an emptying pipe valve for regulating emptying of the sterilizing medium and residual fluid from the filling head space, the emptying pipe valve being positioned with the emptying pipe and being displaceable along a longitudinal axis perpendicular to the longitudinal axes of the first and second valves; and

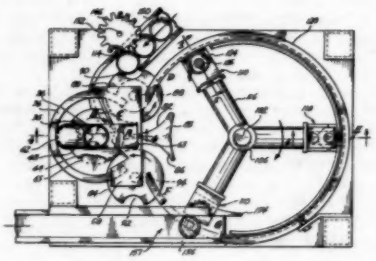
means for actuating the first valve, second valve and emptying pipe valve along their respective longitudinal axes.

4,893,660

CONTAINER FILLING SYSTEM

Marvin I. Berg, Tacoma; Stavros Mihail, Seattle, and John E. Oman, Edmonds, all of Wash., assignors to Promation Incorporated, Seattle, Wash.

Continuation of Ser. No. 81,972, Aug. 5, 1987, abandoned. This application Nov. 9, 1988, Ser. No. 271,385
Int. Cl.[4] B65B 39/12
U.S. Cl. 141—144 21 Claims



1. A container filling system for introducing controlled volumes of filler material into containers, the system comprising:

measuring means for receiving a predetermined volume of filler material, said measuring means rotatable about a primary axis;

feed means for introducing filler material into said measuring means under pressure and along a first axis defined with respect to said measuring means; and

discharge means for discharging material from said measuring means along said first axis and into one of the containers, said discharge means rotatable about a secondary axis different from said primary axis.

4,893,661

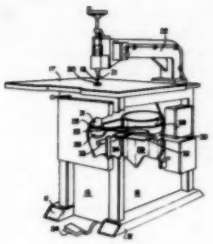
DRIVE BELT TENSION CONTROL APPARATUS FOR INVERTED ROOTER

Thomas C. Onsrud, Troutman, N.C., assignor to C. R. Onsrud, Inc., Troutman, N.C.

Filed Feb. 22, 1989, Ser. No. 313,983
Int. Cl.[4] B27C 5/02
U.S. Cl. 144—134 A 18 Claims

1. In an inverted router characterized by having a drive motor, a motor driven pulley, a spindle, and a drive belt for transferring power from the motor driven pulley to said spindle, the improvement comprising drive belt tension control apparatus, said drive belt tension control apparatus comprising:

(a) mounting means for mounting said motor driven pulley in continuously variable spaced-apart relation to said spindle during machine operation;



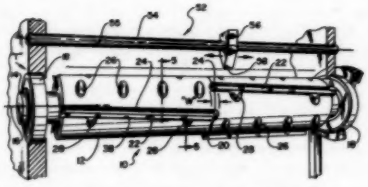
(b) pressure means for exerting a predetermined pressure on said motor driven pulley and thereby a predetermined tension on said drive belt during machine operation.

4,893,662

CUTTING TOOL

Vito Gervasi, 1888 Derby Dr., Oregon, Wis. 53575

Filed Dec. 6, 1988, Ser. No. 280,553
Int. Cl.[4] B27C *1/02*; B27G *13/00*
U.S. Cl. 144—230 35 Claims



1. In a wood planer, apparatus comprising:

(a) a generally cylindrical cutterhead having an axis of revolution, an outer surface and at least one generally elongated slot in said surface, said slot having a bottom and one long wall joined to said bottom, said one long wall of said slot being defined by a flat plane which is inclined at acute angle relative to a flat plane which contains said axis;

(b) a flat cutting blade adapted to fit within said slot and against said one long wall, said blade having two parallel spaced apart flat sides, a flat base between said sides, two opposite ends which are generally perpendicular to said base and said sides, and a straight flat bevelled cutting edge which is located opposite to said base; and

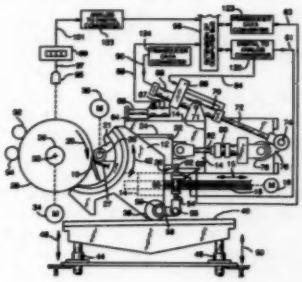
(c) alignment and holding means, carried by said cutterhead, for holding said blade in said cutterhead against said one long wall of said slot and for aligning said blade relative to said outer surface to have one end of said cutting edge present a first predetermined cutting angle and an opposite end of said cutting edge present a second predetermined cutting angle which is greater than said first predetermined cutting angle and to have said one end of said cutting edge located substantially at the same distance from said axis as said opposite end of said cutting edge, said first and second angle being selected to optimize the planing of a family of hardwoods or one species of hardwood.

4,893,663

CONTROL SYSTEM AND METHOD FOR AUTOMATIC ADJUSTMENT OF LATHE COMPONENTS IN RESPONSE TO TEMPERATURE OF LOG

Gary W. Ely, Canby, Oreg., assignor to The Coe Manufacturing Company, Portland, Oreg.

Continuation-in-part of Ser. No. 276,969, Nov. 18, 1988. This application Apr. 14, 1989, Ser. No. 337,897
Int. Cl.[4] B27B *1/00*; B27L *5/02*
U.S. Cl. 144—356 15 Claims



1. A method of operating a veneer lathe apparatus including the steps of:

rotating a log with powered drive means about an axis of rotation;

peeling veneer from the log with a lathe knife as the log is rotated;

compressing the surface of the log during peeling with a nose bar means at a position immediately in front of the lathe knife and spaced from said knife by a knife gap;

sensing the temperature of the outer surface of the log with temperature sensor means during peeling to produce an electrical control signal corresponding to the sensed temperature; and

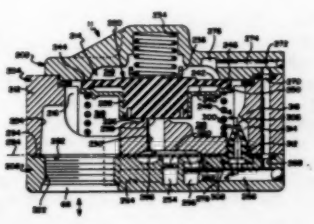
automatically adjusting at least one lathe component engaging the log in response to said control signal.

4,893,664

WHEEL END VALVE FOR CENTRAL TIRE INFLATION SYSTEM

Jerry M. Oltean, Windsor, Canada, assignor to Eaton Corporation, Cleveland, Ohio

Filed Sep. 12, 1988, Ser. No. 243,005
Int. Cl.[4] B60C *29/00*
U.S. Cl. 152—416 4 Claims



1. A wheel end valve assembly for a central tire inflation system comprising a valve body having a first fluid connection defined by a first port for connection to a selectively pressurized and exhausted conduit, a second fluid connection defined by a second port for connection to the interior pressurized

chamber of an inflatable tire, said valve assembly comprising first valve means responsive to pressurization of said selectively pressurized and exhausted conduit to assume a first position for establishing fluid communication between said first and second ports and responsive to exhausting to atmosphere of said selectively pressurized and exhausted conduit to assume a second position for blocking fluid communication between said first and second ports thereof, said first valve means comprising a valve member having a first surface exposed to fluid pressure at said first port and an opposed second larger surface, said valve assembly comprising second valve means constantly in fluid communication with said second port and responsive to a sensed pressurization of said interior chamber of said tire being less than a predetermined minimum reference pressure and an isolation circuit to conduct fluid from said first port past said second valve means to said second large surface to maintain said first valve means in said second position thereof in response to said sensed pressurization of said tire being less than said minimum reference pressure, said assembly characterized by:

a normally opened third valve means in fluid communication with said first port and said isolation circuit thereby maintaining a zero reference pressure differential between said first port and said second larger surface, said third valve means being responsive to a rapid increase in pressure at said first port to close said third valve means and thereby permit said first valve means to open.

4,893,665

CABLES FOR REINFORCING DEFORMABLE ARTICLES AND ARTICLES REINFORCED BY SAID CABLES

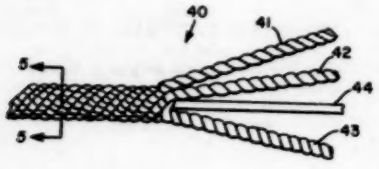
René F. Reuter, Bürden, and Thomas N. H. Welter, Kelspelt, both of Luxembourg, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Feb. 17, 1988, Ser. No. 156,621

The portion of the term of this patent subsequent to May 23, 2006, has been disclaimed.

Int. Cl.[4] D02G *3/48*; B60C *9/18*

U.S. Cl. 152—451 **5 Claims**



1. A cable comprising:

(a) at least two yarns each of which consist only of aramid filaments; and

(b) a single core yarn which is not twisted together with or around any other yarn and consists of at least one filament selected from the group consisting of polyamides having a structure which is at least partially oriented and polyesters having a structure which is at least partially oriented such that a force of about 4 grams per denier is required to elongate said core yarn to 107% of its beginning length, said aramid yarns being adjacent to one another and twisted about said core yarn but not about one another, the denier of said core yarn being in the range of 5% to 30% of the sum of the deniers of said aramid yarns, said cable having a twist multiplier in the range of 5 to 12, and the ratio of twist in the aramid yarns to the twist in the cable being in the range of 1.0 to 2.0.

4,893,666

ARTICULATED OVERHEAD GATE

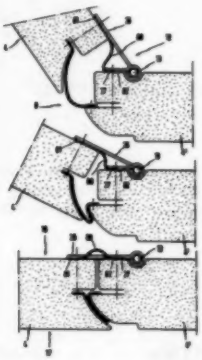
Michael Hörmann, Steinhagen, Fed. Rep. of Germany, assignor to Hörmann KG Brockhagen, Steinhagen/Brockhagen, Fed. Rep. of Germany

Filed Aug. 9, 1988, Ser. No. 230,295

Claims priority, application Fed. Rep. of Germany, Aug. 11, 1987, 3726699; May 18, 1988, 3816985

Int. Cl.[4] E05D *15/10*

U.S. Cl. 160—229.1 **28 Claims**



1. An articulated overhead gate comprising: a series of adjacent and mutually articulated panels having sides facing one another; each panel having an uppermost side in a closed position of said gate, said uppermost side facing a preceding panel and having a curved surface being convex in vertical section; each panel having a lowermost side facing a subsequent panel, said lowermost side having a curved surface being concave in vertical section, each pair of adjacent panels having mutually facing convex and concave curved surfaces defining a curved space therebetween: hinge means connecting adjacent panels, said space being dependent on said hinge means; said hinge means having a pivot axis, said facing convex and concave surfaces shifting in relation to each other as they move about said pivot axis from the closed position of said gate to an open position of said gate, said space being reduced during at least part of said shifting of said facing convex and concave surfaces; said curved space extending from the panel's outer surface, corresponding to the gate's outer surface toward the gate's inner surface through at least a portion of the panel's thickness, said hinge means being connected to said panels on the gate's inner surface; a concave mortise shoulder formed by a surface extending outward from the convex surface and connecting to a surface extending toward the interior of the panel; a resilient tenon shoulder extending out of said concave surface and projecting outward from the side of the panel, said shoulders being located within the remaining portion of the panel's thickness; said shoulders engaging each other as a mortise and tenon joint in the closed position of the gate.

4,893,667

PERFORATED WINDOW COVERINGS

William F. Dunn, 6050 Melody La., Suite 105, Dallas, Tex. 75231

Filed Oct. 2, 1987, Ser. No. 104,212

Int. Cl.[4] E06B *9/00*

U.S. Cl. 160—236 **8 Claims**

1. A light transmitting window covering for placement generally adjacent to a window pane on the building interior space side thereof to provide for admission of a predetermined amount of light to said interior space and substantially unre-

stricted visibility through said covering from said interior space, said covering including:

a panel formed of substantially opaque material, said panel including a substantial number of small spaced apart apertures formed therein to permit direct, generally horizontal rays of light to be transmitted through said panel, and transparent means covering said apertures to form a barrier to air flow through said panel;

said panel including opposed panel portions disposed on opposite sides of said transparent means, each of said panel portions including a set of apertures corresponding to the

set of apertures of the other panel portions, and said panel portions being aligned with each other such that said apertures permit direct transmission of light through said window covering and the registration portions of said transparent means intevening between said panel portions, respectively;

said transparent means including a transparent sheet and said panel portions being spaced from said sheet over a major portion of said sheet to form an insulating air space between said panel portions and said sheet, respectively;

and means for mounting said panel inside a building adjacent to a window pane.

4,893,668

CURTAIN WITH SUCKING DISKS

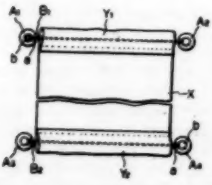
Chieko Nomura, Fukui, Japan, assignor to Home Lace Kyodokumiai (Home Lace Co-operative Union), Japan

Filed Aug. 3, 1988, Ser. No. 227,798

Claims priority, application Japan, Sep. 8, 1987, 62-137328[U]

Int. Cl.[4] E06B *3/80*; A47H *3/00*

U.S. Cl. 160—327 **2 Claims**



1. A curtain apparatus comprising a curtain sheet, passages formed at upper and lower sides of the curtain sheet, rubber cords passed through respective said passages, and sucking disks attached to both ends of each of the rubber cords.

4,893,669

SYNTHETIC RESIN HEAT EXCHANGER UNIT USED FOR COOLING TOWER AND COOLING TOWER UTILIZING HEAT EXCHANGER CONSISTING OF SUCH HEAT EXCHANGER UNIT

Ken Kashiwada, Fujisawa; Tadanobu Muto, Tokyo, and Tetsuo Sasaki, Fujisawa, all of Japan, assignors to Shinwa Sangyo Co., Ltd., Tokyo, Japan

Filed Dec. 19, 1988, Ser. No. 286,291

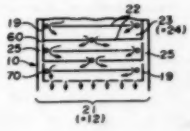
Claims priority, application Japan, Feb. 5, 1988, 62-25388; Mar. 17, 1988, 62-64536

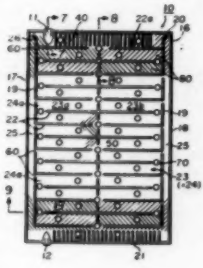
Int. Cl.[4] G05D *15/00*; F28F *3/00, 21/06*

U.S. Cl. 165—38 **20 Claims**

1. A synthetic resin heat exchanger unit used for a cooling tower, of a flat and thin hollow body formed as a whole by two wall plates wherein the interior functions as a liquid flowing passage, a cooling water feed part open externally is formed on an upper portion of the hollow body, a discharge part open externally is also provided on a lower end of the liquid flowing passage which is a lower edge of the hollow body, a major breadth portion of the liquid flowing passage forms a liquid falling speed reducing part, the liquid falling speed reducing part has horizontally extending deflectors distributed vertically throughout the unit each defining a stage, the deflectors are dislocated every other to form a zigzag passage therebetween;

said heat exchanger unit being characterized in that the





liquid falling speed reducing part is disposed to abut on a vertically extending overflowed-liquid escaping conduit through one vertical sealing part at least, an upper end of the vertical sealing part is shaped like a dam, said overflowed-liquid escaping conduit and a reservoir portion on the uppermost stage in the liquid falling speed reducing part communicate with each other through the dam, and an air vent crosses over said vertical sealing part and opens into said overflowed-liquid escaping conduit and is formed at a bent position of said zigzag liquid falling speed reducing part, and a raise is formed as a spacer on outer surfaces of both said wall plates.

4,893,670

INTEGRAL RADIATOR HOSE AND OIL COOLER

Shrikant M. Joshi, Getzville; Lee C. Whitehead, Middleport, and Frederick V. Oddi, Orchard Park, all of N.Y., assignors to General Motors Corporation, Detroit, Mich.

Filed May 24, 1989, Ser. No. 356,102

Int. Cl.[4] B60H *1/00*; B61D *27/00*; F28F *21/06*; F01M *5/00*

U.S. Cl. 165—40 **3 Claims**

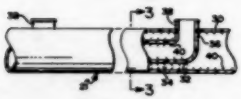
1. In an automotive cooling system, a compound radiator hose for transmitting coolant flow from a radiator to an engine and for cooling oil, comprising:

an outer hose for coupling to one of the radiator and the oil source,

an inner hose within the outer hose and radially spaced therefrom to provide a first passage between the inner and outer hoses, and a second passage within the inner hose,

means for coupling the inner hose to the other of the radiator

and the oil source, whereby heat from the oil is conducted through the wall of the inner hose to the coolant passage so that coolant in the coolant passage can cool the oil, and the inner hose constructed of polymer material and having flexible vanes extending from at least one surface thereof into the respective passage for causing turbulence in the



flow through the respective passage, the vanes being deflected by fluid flow to extend further into the passage during low flow rates in the passage than during high flow rates whereby turbulence in the flow is increased at low flow rates and pressure drop caused by the vanes is reduced at high flow rates.

4,893,671

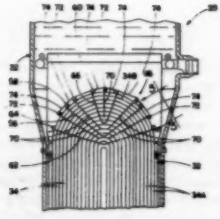
STEAM GENERATOR TUBE ANTIVIBRATION APPARATUS AND METHOD

Hermann O. Lagally, Hempfield Township, Westmoreland County, and Thomas A. Pitterle, Unity Township, Westmoreland Township, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 20, 1988, Ser. No. 208,714

Int. Cl.[4] F28F 7/00

U.S. Cl. 165—162 **13 Claims**



1. In a steam generator for a nuclear reactor power plant including a bundle of U-shaped heat transfer tubes arranged in spaced rows and columns thereof, at least a pair of spaced rows of elongated primary antivibration bars installed between U-shaped portions of said tubes in said spaced columns thereof, and at least a pair of spaced apart retainer members disposed about the exterior of U-shaped portions of said tubes with opposite ends of said bars being rigidly attached to said respective retainer members, an antivibration apparatus for substantially closing gaps between said U-shaped tube portions in said columns thereof and said primary antivibration bars, said apparatus comprising:

(a) at least one row of a plurality of elongated supplementary antivibration bars having pairs of opposite ends, being disposed between said rows of said primary antivibration bars, and extending between said U-shaped portions of said tubes through the space between, at the most, every other one of said spaced columns thereof; and

(b) means for supporting said supplementary bar at respective outer ends thereof such that said supplementary bars are unsupported at respective inner ends thereof and thereby extend in cantilevered fashion between said U-shaped portions of said tubes;

(c) each of said supplementary bars being capable of expansion in a transverse dimension thereof extending between said tubes so as to cause deformation laterally outward away from said respective bars of longitudinal spans of said tubes extending between said spaced row of primary antivibration bars for substantially closing any gaps existing between said U-shaped tube portions in said columns thereof and said primary antivibration bars.

4,893,672

COUNTER-FLOW HEAT EXCHANGER WITH HELICAL TUBE BUNDLE

Emil E. Bader, Zürcherstrasse 1, CH-8142, Uitikon Waldegg, Switzerland

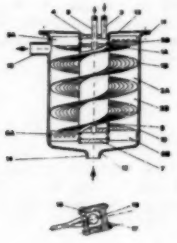
PCT No. PCT/CH87/00106, § 371 Date Apr. 21, 1988, § 102(e) Date Apr. 21, 1988, PCT Pub. No. WO88/01363, PCT Pub. Date Feb. 25, 1988

PCT Filed Aug. 21, 1987, Ser. No. 193,299

Claims priority, application Switzerland, Aug. 21, 1986, 3348/86

Int. Cl.[4] F28D 7/02

U.S. Cl. 165—163 **8 Claims**



1. In a counter-flow heat exchanger of the type comprising:

at least one helical tube bundle arranged in an annular chamber between a core tube and a coaxial tubular shell and connected to a primary inlet and a primary outlet for flow of a primary fluid through said helical tube bundle;

a plurality of contiguous helical tubes associated with said bundle and connected in parallel to said primary inlet and said primary outlet, said helical tubes being coiled in a corresponding helical plane with constant pitch around a common longitudinal axis and being closely arrayed without interruption between said core tube and said tubular shell so as to define therewith at least one closed helical channel connected to a secondary inlet and a secondary outlet so as to thereby provide for flow of a secondary fluid through said closed helical channel in countercurrent with the primary fluid flowing through said helical tube bundle, the improvements comprising;

said helical tube bundle being equipped with two auxiliary connecting compartments lying within said annular chamber and each consisting of a perforated auxiliary connecting plate arranged perpendicular to said corresponding helical plane and a removable cover sealingly mounted on said auxiliary connecting plate and connected to said primary inlet or outlet; and

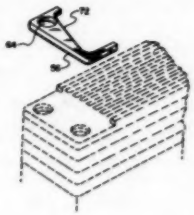
said auxiliary connecting plate comprising staggered perforations arranged parallel to said corresponding helical plane and offset with respect thereto so that the ends of said contiguous helical tubes are accommodated in corresponding perforations and sealingly secured in said connecting plate without undergoing significant bending with respect to said corresponding helical plane.

4,893,673

ENTRY PORT INSERTS FOR INTERNALLY MANIFOLDED STACKED, FINNED-PLATE HEAT EXCHANGER

Irwin E. Rosman, Rancho Mirage, and William R. Wagner, Los Angeles, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 31, 1984, Ser. No. 666,866
Int. Cl.[4] F28F 3/08, 3/04
U.S. Cl. 165—167 5 Claims



1. An internal plate assembly for a plate-stacked heat exchanger comprising:

a four-sided plate having an upper face and a flat lower face, the upper face having a flat surface adjacent two opposite sides thereof, the upper surface having a wall upstanding therefrom extending along each of the other two sides, a plurality of upstanding fins centrally located upon said upper face and extending substantially parallel with and between the walls, the spaces between the fins defining a plurality of channels, the plate further including first and second ports located in each of the flat surfaces adjacent the sides at such locations that the plate may be rotated 180° from another such plate and the ports in both plates will still occupy mating positions; and

means for passing a fluid flowing along a first plate to an alternate plate stacked above it and for preventing the flow from entering a next adjacent plate above the first plate through an entry port in the adjacent plate, said next adjacent plate being stacked between said first plate and said alternate plate, said means including a pair of substantially identical flat inserts, each of said inserts having a port therethrough to mate with one of the ports adjacent one side of said plate and further being formed to avoid covering the second port in the same side of said plate, the top surface of the insert being coplanar with a top surface of the walls and fins such that said pair of inserts and the walls enclose the periphery of said fins, and said inserts and the flat surfaces on the upper face of said plate form an open manifold area providing fluid communication between one of said ports in said plate and the plurality of channels.

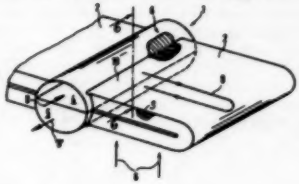
4,893,674

METHOD OF PRODUCING A TUBULAR DISTRIBUTOR OF A HEAT EXCHANGER FROM JUXTAPOSED POROUS STRIPS OF MATERIAL

Klaus Hagemeister, Munich, Fed. Rep. of Germany, assignor to MTU Motoren-und Turbinen-Union Munchen GmbH, Munich, Fed. Rep. of Germany

Filed Oct. 18, 1988, Ser. No. 259,183
Claims priority, application Fed. Rep. of Germany, Oct. 23, 1987, 3735846
Int. Cl.[4] F28D 7/06
U.S. Cl. 165—176 20 Claims

20. A fluid distributor of a heat exchanger comprising a tubular distributor for a heat exchange fluid, and a plurality of heat exchange tubes sealingly connected to said distributor for flow of the heat exchange fluid between the distributor and the heat exchange tubes, said tubular distributor being constituted as an integrated assembly of a plurality of successive layers of juxtaposed strips of fiber material squeezed together and deformed around rows of said heat exchange tubes interposed between adjacent strips and a metallic material filling said strips of fiber material.

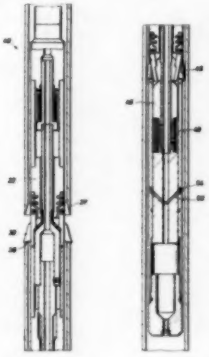


4,893,675

SECTION MILLING TOOL

Uvon Skipper, 7409 S. Rice Ave., Bellaire, Tex. 77401

Filed Nov. 21, 1988, Ser. No. 273,906
Int. Cl.[4] E21B 29/00
U.S. Cl. 166—55.8 13 Claims



1. A miller for lowering into a cased well for milling a casing from the well, the miller comprising:

(a) an elongate outer tubular body having an inner axial passage therealong and adapted to be connected at the upper end thereof to a pipe string in the casing for rotation and lowering into the casing;

(b) a movable inner mandrel within said outer body, said inner mandrel movable between an initial position in said outer body and an operative position relative to the initial position therein;

(c) first cutters movably mounted on and supported by said outer body and having outwardly facing cutting edges for contact against surrounding casing wherein said cutters are constructed with cutting surfaces for cutting the casing on rotation of said outer body;

(d) first shoulder means movable with said inner mandrel for operatively moving said first cutters radially outwardly into a cutting position;

(e) second cutters movably mounted on and supported by said outer body and having outwardly facing cutting edges for contact against surrounding casing wherein said second cutters are constructed with cutting surfaces for cutting the casing on rotation of said outer body;

(f) second shoulder means movable with said inner mandrel for operatively moving said second cutters, said second

shoulder means causing said second cutters to move radially outwardly into a cutting position;

(g) telescoping means cooperating with said inner mandrel for moving said first shoulder means, thereby actuating said first cutters, and simultaneously positioning said second shoulder means for operation of said second cutters prior to moving said second cutters outwardly into a cutting position, said telescoping means slidably positioning said second shoulder means for sliding movement relative to said body.

4,893,676

WELL TREATING METHOD AND ASSOCIATED APPARATUS FOR STIMULATING RECOVERY OF PRODUCTION FLUIDS

Gilman A. Hill, 7128 S. Poplar La., Englewood, Colo. 80112, assignor to Gilman A. Hill, Englewood, Colo.

Continuation-in-part of Ser. No. 139,614, Dec. 30, 1987, Pat. No. 4,823,875, which is a continuation-in-part of Ser. No. 943,551, Dec. 18, 1986, Pat. No. 4,718,493, which is a continuation-in-part of Ser. No. 686,990, Dec. 27, 1984, Pat. No. 4,633,951. This application Feb. 28, 1989, Ser. No. 317,623

Int. Cl.[4] E21B *33/138, 33/16, 43/267*

U.S. Cl. 166—280 **34 Claims**

1. A method of accurately and reliably sealing off a relatively short earth fracturing perforation zone which is formed in a well casing, has upper and lower ends, and is positioned adjacent a subterranean fracture zone, the well casing having a first fluid column therein with an upper end positioned above the perforation zone, said method comprising the steps of:

forming a perforation plugging slurry column, having a predetermined volume, within the casing above the first fluid column;

forming a second fluid column within the casing above said perforation plugging slurry column;

interposing first sliding plug seal means between the first fluid column and said perforation plugging slurry column, said first sliding plug seal means being operative, during forced downward movement of said perforation plugging slurry column, to prevent significant intermixing between said perforation plugging slurry column and the first fluid column;

interposing second sliding plug seal means between said perforation plugging slurry column and said second fluid column, said second sliding plug seal means being operative, during forced downward movement of said perforation plugging slurry column and said second column, to prevent significant intermixing between said perforation plugging slurry column and said second fluid column; and

forcing said second fluid column downwardly through the well casing to drive said perforation plugging slurry column, in an essentially plug-like longitudinally undistorted configuration, toward the perforation zone, and then causing it to enter the perforation zone and form therealong a perforation plug structure defined in part by a longitudinal portion of said perforation plugging slurry column.

20. A sliding plug seal structure interposable between facing end portions of first and second cylindrical fluid sections, disposed in a pipe having an inside diameter, to prevent significant intermixing between said facing end portions when said first and second cylindrical fluid sections are driven axially along the interior of the pipe, said sliding plug seal structure comprising:

a cylindrical section of high strength, flexible sealing gel material having a diameter equal to the inside diameter of the pipe; and

at least one pipe-sized solid sealing element positioned within a longitudinally intermediate portion of said cylindrical sealing gel material section.

4,893,677

GUIDELINELESS REENTRY SYSTEM WITH RETRACTING ROLLERS

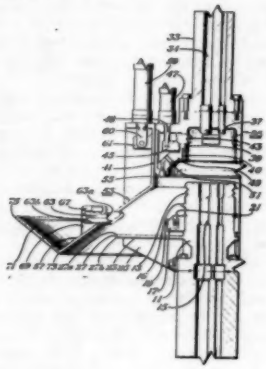
Norman Brammer, Turriff, Scotland, and Charles E. Jennings, Houston, Tex., assignors to Vetco Gray Inc., Houston, Tex.

Continuation-in-part of Ser. No. 99,360, Sep. 21, 1987, abandoned. This application Dec. 2, 1988, Ser. No. 278,898

The portion of the term of this patent subsequent to Apr. 25, 2006, has been disclaimed.

Int. Cl.[4] E21B *43/013*

U.S. Cl. 166—341 **8 Claims**



1. An apparatus for connecting a riser extending from a floating vessel to a subsea well assembly of the type having an upward extending tubular mandrel with a plurality of grooves on its exterior, comprising in combination:

a guide frame mounted to the mandrel a selected distance below the top of the mandrel;

an annular hydraulic manifold mounted to the mandrel above the guide frame and below the top of the mandrel, having a plurality of hydraulic passages for communicating hydraulic fluid delivered from the floating vessel to equipment on the subsea well;

a mandrel connector mounted to the lower end of the riser for landing on the top of the mandrel to communicate the interior of the mandrel with the interior of the riser;

a plurality of dogs carried by the mandrel connector for radial movement between an outer retracted position and

an inner locked position in engagement with the grooves on the mandrel;

cam means carried by the mandrel connector and hydraulically actuated for moving the dogs between the retracted and locked positions;

an annular hydraulic manifold connector mounted to the mandrel connector, having a plurality of hydraulic passages for connection to a supply of hydraulic fluid on the vessel, the manifold connector being positioned to engage the manifold;

a downward facing guide funnel carried by the riser for insertion over the mandrel into engagement with the guide frame;

roller means carried by the funnel for latching the funnel to the guide frame for preventing upward movement of the funnel relative to the guide frame and for allowing rolling engagement of the funnel relative to the guide frame after the funnel has latched to the guide frame to allow the mandrel connector to be rotated to a proper orientation;

means operatively connected between the mandrel connector and funnel for moving the funnel from a lower extended position relative to the riser and mandrel connector as the funnel is being lowered into engagement with the guide frame to an upper retracted position once the funnel has landed on the guide frame, causing the riser and mandrel connector to move downward relative to the funnel onto the mandrel and the manifold connector onto the manifold, and positioning the cam means around the mandrel, to allow the cam means to operate to move the dogs to the locked position to secure the mandrel connector to the mandrel.

4,893,678

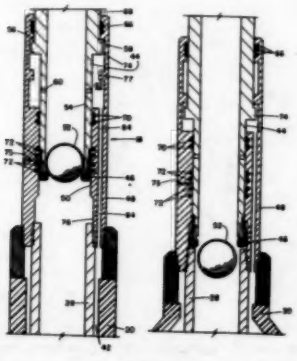
MULTIPLE-SET DOWNHOLE TOOL AND METHOD

Charles O. Stokley, and Lawrence Sanford, both of Houston, Tex., assignors to Tam International, Houston, Tex.

Continuation of Ser. No. 204,087, Jun. 8, 1988, Pat. No. 4,823,882. This application Dec. 30, 1988, Ser. No. 292,235 The portion of the term of this patent subsequent to Apr. 25, 2006, has been disclaimed.

Int. Cl.[4] E21B *23/04*

U.S. Cl. 166—374 **20 Claims**



1. A multiple-set downhole tool assembly for selectively positioning within a well bore while suspended from a tubing string having a passageway, the downhole tool assembly adapted to be activated in the well bore by lowering a ball having a selectively sized diameter through the tubing string to plug the passageway and thereafter pressurizing fluid in the passageway above the set ball, the downhole tool assembly comprising:

a body defining at least in part an expandable and retractable fluid chamber:

a control sub secured to the body and having an interior guide wall, a recessed cavity radially outward of the guide wall and a flow path in pressure communication with the fluid chamber whereby the fluid chamber may be expanded by fluid pressure in the flow path in the control sub;

a sleeve axially movable within the control sub from a ball stop position to a ball release position, the sleeve having a cylindrical-shaped interior surface having a selectively sized diameter slightly larger than the diameter of the ball, and having a port for fluid communication between the passageway in the tubing string and the flow path in the control sub when the sleeve is in the ball stop position;

a seal for automatically closing off communication between the passageway in the tubing string and the flow path in the control sub when the sleeve is in the ball release position; and

a stop member carried by the sleeve and radially movable from an inward position such that the ball is axially stopped by the stop member within the cylindrical shaped interior surface of the sleeve, to an outward position such that the ball may be passed axially by the sleeve and the stop member;

the stop member being restricted from radially outward movement to its outward position by the interior guide wall of the control sub when the sleeve is axially in the ball stop position, and the stop member being movable radially outward into the recessed cavity within the control sub when the sleeve is axially in the ball release position, whereby the ball may be lowered into engagement with the stop member when the sleeve is in the ball stop position, pressurized fluid in the passageway above the ball passed through the port in the sleeve and the flow path in the control sub for activating the downhole tool assembly in the well bore, and the sleeve thereafter moved to the ball release position to seal pressurized fluid in the body and permit the ball to pass by the stop member as the stop member is positioned radially outward into the recessed cavity.

4,893,679

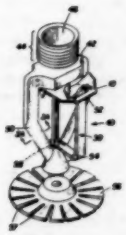
HEAT-RESPONSIVE ELEMENT FOR FIRE PROTECTION SPRINKLERS OR THE LIKE

James M. Martin, East Greenwich; Leo W. Fleury, Jr., North Smithfield, and Michael A. Fischer, West Kingston, all of R.I., assignors to Grinnell Corporation, Exeter, N.H.

Filed Mar. 1, 1988, Ser. No. 162,479

Int. Cl.[4] A62C *37/12*

U.S. Cl. 169—39 **12 Claims**



8. In a fire protection sprinkler head of the type including a base having a throat of predetermined cross-section through which a stream of fire retardant fluid can flow,

the improvement wherein

said fire protection sprinkler head further comprises a heat-responsive element comprising two link members joined

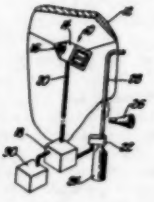
with a thin solder layer in a face-to-face relationship over an extended surface area, the components of opposed surfaces of said link members in contact with said solder layer and said solder layer being adapted to alloy with each other in the regions immediately adjacent each of said opposed surfaces to form alloy bonds between said opposed surfaces and said solder layer, the strength of said alloy bonds being greater than the strength of said solder layer, and at least said opposed surfaces of said link members comprises an alloy-forming amount of a member selected from the group consisting of nickel, cobalt, chromium and iron, or of an alloy of a member selected from the group consisting of nickel, cobalt, chromium, and iron.

4,893,680

FIRE SUPPRESSION ACTIVATOR

Donald R. Witthrodt, Ft. Mill, S.C., and Wilbert Simkovitz, Southfield, Mich., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 17, 1988, Ser. No. 258,948
Int. Cl.[4] A62C 37/18
U.S. Cl. 169—60 **2 Claims**



1. A fire suppression control system for use with a vehicle subject to catastrophic incidents the fire suppression system containing at least one pressurized container of halogenated material suitable for suppressing a fire, a distribution system for distributing the halogenated material to the situs of a fire within the vehicle, a valve disposed between the bottle and the distribution system to maintain the halogenated material in the bottle until needed and adapted to open rapidly when the fire suppression material is needed, a fire sensor which will sense the presence of a fire which will require the dispensing of the fire suppressing material and generate a signal that action is necessary, a control amplifier adapted to receive the signal from the sensor and in response to the signal activate the system by opening the valve, a source of power to provide power to operate the system, the improvement comprising an amplifier circuit having an amplifier maintained at a nominal voltage in the quiescent state, a circuit portion adapted to maintain the amplifier's nominal voltage, a second circuit element adapted to sense when the electrical connection between the sensor and the amplifier is broken and generate an increased voltage which will activate the valve to dispense extinguishant to the damaged area, a third circuit element which will pass a sensor signal to the amplifier and open the valve when the sensor signals the presence of a fire.

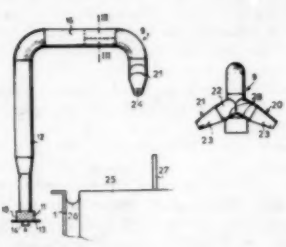
4,893,681

FIREFIGHTING INSTALLATION FOR FLOATING ROOF HYDROCARBON STORAGE TANKS

Rene Flandre, 495 rue du II Novembre, Zone Industrielle, 76650 Petit Couronne, France

Filed Sep. 29, 1988, Ser. No. 250,763
Int. Cl.[4] A62C 3/12
U.S. Cl. 169—66 **4 Claims**

1. Firefighting installation for floating roof hydrocarbon storage tanks comprising a series of vertical pipes disposed regularly around a storage tank, a sprayer at the top of each pipe adapted to form a flat jet of extinguishing foam directed towards the interior of the tank along its inside wall, a pressurized water supply connected to said pipes, emulsifying agent feed means between said water supply and said pipes, and an air injector on each pipe near said sprayer to favor the formation of the foam, wherein said sprayer include two nozzles set at an angle to each other and directed towards said floating roof and each nozzle incorporates a longitudinal slot in its end portion opposite its free end and facing towards said floating roof.

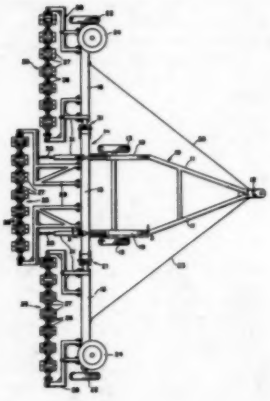


4,893,682

ROTATING FLEXIBLE IMPLEMENT FOR SOIL EROSION CONTROL

Bruce W. Smallacombe, Capella, Queensland, 4702, Australia

Continuation-in-part of Ser. No. 44,193, Apr. 30, 1987, abandoned. This application Nov. 30, 1988, Ser. No. 277,974
Claims priority, application Australia, Jun. 10, 1986, PH6318
Int. Cl.[4] A01B 29/06, 35/16
U.S. Cl. 172—311 **8 Claims**



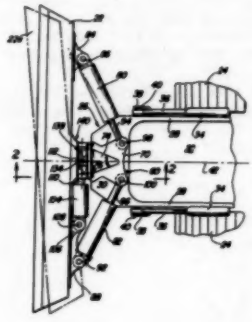
1. An agricultural implement for soil erosion control, of the type having a mobile mounting frame capable of being moved across an area to be treated, and a soil working assembly connected to carrier means to the mounting frame transversely of the direction of travel, wherein the soil working assembly comprises:

a flexible chain of interconnected links connected at its opposite ends to the carrier means for rotation of the chain about its axis, the axis of the chain being transverse to the direction of travel; and

a pair of blades fixed to and extending in opposite directions from opposite sides of each link, said blades being adapted

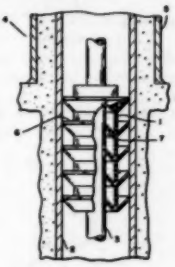
to penetrate gravitationally and scoop hollows from the soil as the implement is advanced, rotating the chain over the soil.

4,893,683
DOZER BLADE MOUNTING ASSEMBLY
Rudolf Horsch, Wausau, and Claude M. Frisbee, Schofield, both of Wis., assignors to J. I. Case Company, Racine, Wis.
Continuation-in-part of Ser. No. 83,533, Aug. 7, 1987, Pat. No. 4,828,044. This application Apr. 28, 1989, Ser. No. 344,623
Int. Cl.[4] E02F *3/815*
U.S. Cl. 172—821 6 Claims



3. A mounting assembly supporting a blade on a tractive vehicle, comprising a blade support frame at the forward end of said vehicle, a universal joint interconnecting a lower midportion of said blade and said frame generally in a longitudinal axis of said vehicle, a mast assembly connected to said frame and extending upwardly from said frame adjacent said blade midportion, a pair of hydraulic angling cylinders, each of said angling cylinders having one end pivotally connected to one side of said blade and an opposed end pivotally connected to said mast assembly adjacent said longitudinal axis, said angling cylinders extending outwardly from said mast assembly at an angle to said vehicle longitudinal axis for angling said blade about said universal joint, a hydraulic tilt cylinder pivotally connected between one side of said blade and said mast assembly for tilting said blade about said universal joint, and a bracket assembly including bracket members connected to an upper midportion of said blade and said mast assembly spaced vertically above said universal joint, one of said bracket members including an elongated slot having generally parallel side surfaces extending generally perpendicular to said vehicle longitudinal axis and the other of said bracket members having a slide member rotatably supported thereon and disposed in said one bracket member slot, said slide member having a width substantially equal to the width of said slot measured perpendicular to said side surfaces preventing pitching of said blade about said universal joint and said slide member having a length substantially less than the length of said slot permitting tilting of said blade, and said bracket and slide including means for permitting adjustable positioning of said blade to a selected pitch position.

4,893,684
METHOD OF CHANGING WELL FLUID
Robert L. Alexander, Spring, Tex., assignor to Chevron Research Company, San Francisco, Calif.
Continuation-in-part of Ser. No. 63,190, Jun. 17, 1987, abandoned. This application Apr. 5, 1989, Ser. No. 334,019
Int. Cl.[4] E21B *7/00, 37/04*
U.S. Cl. 175—65 2 Claims



1. A method of changing well fluid comprising the steps of:
(a) performing well drilling operations with a first drilling fluid and then setting casing;
(b) inserting around an inner tubular member which does not include drill bit attached to the lower end thereof an elastomeric annular wiper plug into an annular space between the well casing and the inner tubular member, said annular wiper plug having inner and outer ribs said outer ribs adapted to fit snugly into said well casing and said inner ribs adapted to fit snugly around said inner tubular member said annular space substantially filled with a first well fluid;
(c) circulating a second well fluid downwardly through the annular space between the casing and inner tubular member above said wiper plug, said wiper plug wiping the outside of said inner tubular member with said inner ribs and the inside of said casing with said outer ribs said wiper plug preventing the mixing of said first well fluid and said second well fluid;
(d) tripping out to attach a drill bit to the lower end of said inner tubular member, and tripping back in; and
(e) performing well drilling operations with said second well fluid.

4,893,685
SCALE
Donald A. Bergman, Roscoe, and Robert A. O'Neil, Glen Ellyn, both of Ill., assignors to Newell Co., Freeport, Ill.
Filed Jan. 12, 1989, Ser. No. 296,571
Int. Cl.[4] G01G *23/14*
U.S. Cl. 177—174 17 Claims

1. A scale comprising a base, a housing, and means for mea-

suring and indicating weight applied to said housing, said means including a rotating indicator and stationary indicia means carried by said housing having values corresponding to said weight,

an upper surface of said housing including an opening for receiving a shaft to which said indicator is attached.

4,893,686

DRAFT PROTECTION DEVICE FOR PRECISION BALANCES

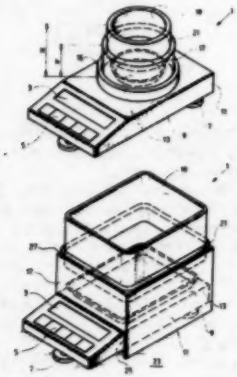
Philippe Chretien, Dietlikon, and Bruno Basert, Ebertswil, both of Switzerland, assignors to Mettler Instrumente AG, Greifensee, Switzerland

Filed May 1, 1989, Ser. No. 345,780

Claims priority, application Switzerland, Jun. 21, 1988, 2379/88

Int. Cl.[4] G01G *21/28*

U.S. Cl. 177—180 **11 Claims**



1. A draft protection device for a precision balance including an exposed weighing dish, the draft protection device comprising a first hollow body surrounding the weighing dish, and at least one second hollow body, the first hollow body and the at least one second hollow body each being open at the top and the bottom thereof, the at least one second hollow body being mounted on the first hollow body so as to be telescopically slidable relative to the first hollow body.

4,893,687

MOUNTING ARRANGEMENT FOR A POWER TRAIN MODULE OF A VEHICLE

Gerald P. Simmons, Morton, Ill., assignor to Caterpillar Inc., Peoria, Ill.

Continuation of Ser. No. 126,379, Nov. 30, 1987, abandoned. This application Feb. 28, 1989, Ser. No. 318,433

Int. Cl.[4] B62D *55/065, 55/096*

U.S. Cl. 180—9.1 **21 Claims**

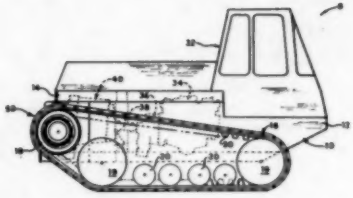
1. A mounting arrangement for a power train module of a vehicle having a frame and a pair of endless tracks, comprising:

the power train module having a pair of oppositely outwardly extending hollow trunnions, a wheel rotatably supported on each of the trunnions and drivingly engaging each of the tracks, and output means for drivingly rotating each of the wheels;

the frame defining a pair of generally longitudinally arranged, semicylindrical pockets that face inclinably upwardly and longitudinally outwardly;

bushing assembly means for resiliently supporting each of the trunnions in the respective pockets of the frame along a transverse axis; and

mount means connected to the frame longitudinally inwardly of the pockets for resiliently resisting rotational forces of the power train module about the transverse axis,



the bushing assembly means and the mount means minimizing the transmission of noise to the frame.

4,893,688

ELECTRIC REAR WHEEL STEERING APPARATUS

Mitsuharu Morishita, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

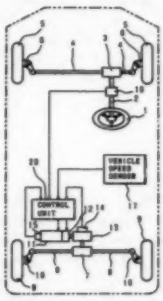
PCT No. PCT/JP87/00928, § 371 Date Sep. 23, 1988, § 102(e) Date Sep. 23, 1988, PCT Pub. No. WO88/04251, PCT Pub. Date Jun. 16, 1988

PCT Filed Nov. 30, 1987, Ser. No. 245,438

Claims priority, application Japan, Dec. 4, 1986, 61-290671

Int. Cl.[4] B62D *5/04, 6/02, 7/14*

U.S. Cl. 180—79.1 **2 Claims**



1. An electric rear wheel steering apparatus for steering rear wheels of a vehicle by a motor

having a worm

reduction gear

(11) depending on the steering state of front wheels of said vehicle, comprising: a steering wheel steering state sensor (16) for detecting at least one of the steering states of the steering direction, steering angle, steering torque, and steering speed of the steering wheel , a vehicle speed sensor (17) for detecting the vehicle speed, a motor rotation speed sensor (15) for detecting the rotation direction and rotation speed of said motor, a rear wheel steering angle sensor (14) for detecting the steering angle of rear wheels, an electromagnetic clutch (12) disposed between said motor and said worm reduction gear (13) for transmitting the rotation force of the motor having a reversion efficiency of zero or lower so as to engage or disengage the rotation force of the motor, a gear box (7) for steering the rear wheels being driven by the output of said worm reduction gear, and a control unit (20) for receiving signals from said steering wheel steering state sensor, said vehicle speed sensor, said motor rotation speed sensor,

and said rear wheel steering angle sensor to drive and control the motor in response to

said sensor signals, and for cutting off the current supply to the motor and disengage the electromagnetic clutch when an abnormal operation other than predetermined operation is ascertained.

4,893,689

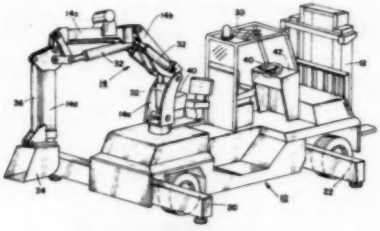
METHOD AND APPARATUS FOR STEERING A MOTOR VEHICLE

Victor R. Laurich-Trost, 34600 McAfee Dr., Solon, Ohio 44139

Continuation of Ser. No. 69,096, Jul. 2, 1987, abandoned. This application May 24, 1988, Ser. No. 198,720

Int. Cl.[4] B62D 7/14

U.S. Cl. 180—140 10 Claims



3. A vehicle comprising: a vehicle body; two front wheels rotatably mounted to the body for synchronous turning movement; two rear wheels rotatably mounted to the body for synchronous turning movement; four hydraulically driven steering motors, each coupled to an associated one of said front and rear wheels for effecting a turning of said wheels; a source of pressurized fluid for powering said motors; first conduit means for supplying said pressurized fluid to the front wheels and second conduit means for supplying said pressurized fluid to the rear wheels; and a power steering system, said power steering system comprising:

(a) a steering control valve interposed between the pressurized source and the first and second conduit means, said steering control valve coupled to a vehicle steering mechanism to turn the vehicle to the right and to the left by directing fluid pressure to said steering motors;

(b) on/off valve means coupled to said first and second conduit means to direct pressurized fluid from the steering control valve to steering motors for steering a master set of front or rear wheels;

(c) servo control means coupled to the pressurized source to direct pressurized fluid to steering motors for turning a slave set of wheels not coupled to the steering control valve by the on/off valve means;

(d) feedback control means including means for monitoring the orientation of at least one wheel of the master set of wheels and at least one wheel of the slave set of wheels and activating the servo control means to cause the slave wheels to be re-oriented based upon said monitoring; and

(e) mode select means controllable by a vehicle user and coupled to the on/off valve means, servo control means, and feedback control means to select a master and slave set of wheels and a mode of response of the slave wheels to the monitoring of the wheel orientation.

4,893,690

FOUR-WHEEL STEER CONTROL SYSTEM

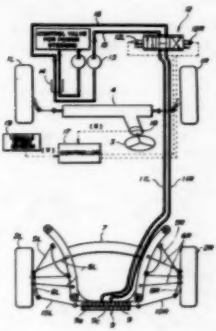
Kazunori Mori, Ebina; Fukashi Sugasawa, Yokohama; Kenji Kawagoe, Kaminokawa, and Hiroshi Mori, Yokosuka, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Nov. 30, 1988, Ser. No. 277,744

Claims priority, application Japan, Nov. 30, 1987, 62-299888; Feb. 12, 1988, 63-28858

Int. Cl.[4] B62D 5/06

U.S. Cl. 180—140 5 Claims



1. A steering control system for a wheeled vehicle having a set of steerable front wheels, a set of steerable rear wheels, a steering wheel and a steering gear, comprising:

means for performing a main steer of said front wheels by an angle determined by said steering gear in response to a steering operation of said steering wheel;

means for performing, in addition to said main steer, a secondary steer of said front and rear wheels in response to said steering operation of said steering wheel by angles computed using a steer angle steer angle angular velocity θ and vehicle speed V from the following formulas,

$$\delta f = \frac{1}{N}\{Kf \cdot \theta + Tf \cdot \dot{\theta}\}$$

$$\delta r = \frac{1}{N}\{Kr \cdot \theta + Tr \cdot \dot{\theta}\}$$

where δf is a front wheel secondary steer angle, δr is a rear wheel secondary steer angle, N is a steering gear ratio and Kf, Kr, Tf and Tr are control constants which are functions of vehicle speed;

means for correcting said control constants Kf and Kr in such a way that said control constants Kf and Kr become a steady-state value when said steer angle is larger than a predetermined value and become smaller than said steady-state value when said steering angle becomes smaller than said predetermined value;

means for correcting said control constants Tf and Tr in such a way that said control constants Tf and Tr become a steady-state value when said steer angle is larger than a predetermined value and become smaller than said second mentioned steady-state value when said steer angle becomes smaller than said second mentioned predetermined value;

means for correcting said control constants Kf and Kr in such a way that said control constant Kr reduces at the rate larger than said control constant Kf as said steer angle reduces from said first mentioned predetermined value; and

means for correcting said control constants Tf and Tr in such a way that said control constant Tf reduces at the

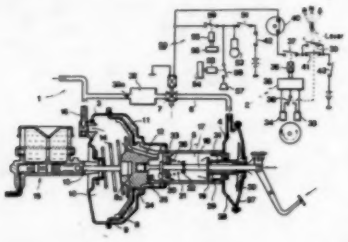
rate larger than said control contant Tr as said steer angle reduces from said second mentioned predetermined value.

4,893,691

AUTOMATIC BRAKING SYSTEM FOR A VEHICLE

Jong S. Park, 282-4, Sangil-dong, Kangdong-ku, Seoul, Rep. of Korea

Filed Feb. 12, 1988, Ser. No. 155,576
Int. Cl.[4] B60T 7/12
U.S. Cl. 180—169 **7 Claims**



1. An automatic braking system for a vehicle comprising:
a brake pedal;
a master cylinder;
a first power brake cylinder having a first diaphragm and a plate which is provided with a valve rod connected to the brake pedal and a push rod connected to the master cylinder;
a valve cylinder axially extending generally perpendicular to the plate;
a second power brake cylinder;
a vacuum pipe connecting said first power brake cylinder to said second power brake cylinder;
a three-directional electromagnetic valve positioned in said vacuum pipe, said three-directional electromagnetic valve being movable to switch said vacuum pipe between atmosphere or vacuum; and
control means connected electrically with said three-directional electromagnetic valve for sensing one of forward and backward movement of the vehicle.

4,893,692

SNOWMOBILE

Morley L. Smith, Beaconsfield, Canada, assignor to GSM Design, Saint-Laurent, Canada

Filed Aug. 11, 1988, Ser. No. 231,339
Int. Cl.[4] B62D 25/16
U.S. Cl. 180—190 **8 Claims**

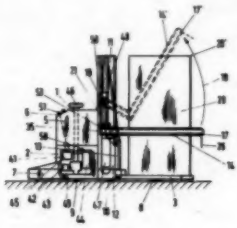
1. A floatable snowmobile comprising an elongated one-piece molded polymeric/copolymeric synthetic plastics body; a pair of skis, means for supporting said skis relative to said body; said body including a front engine compartment portion, an elongated bench-seat portion, and a cargo support portion; the engine compartment portion of the body defining a recess for receiving an engine and accessories; at least the bench-seat portion defining a track run recess in the bottom thereof for accommodating a track assembly; said body being defined by a generally hollow shell; said hollow shell setting-off hollow front, medial and rear hollow compartment portions; a pair of side walls on each side of said body; each pair of side walls defining an upstanding hollow side wall compartment portion; said hollow side wall compartment portions being on opposite sides of a floor of said front engine compartment portion; and high buoyancy polymeric/copolymeric synthetic cellular foamed in situ plastics generally filling said hollow compartment portions and said hollow side wall compartment portions.

4,893,693

SAFETY ARRANGEMENT FOR FORK TRUCKS

Hans-Jürgen Hachmann, Elmhorn, and Siegfried Hoener, Hamburg, both of Fed. Rep. of Germany, assignors to Firma Jungheinrich Unternehmensverwaltung KG, Hamburg, Fed. Rep. of Germany

Filed Sep. 16, 1988, Ser. No. 245,826
Claims priority, application Fed. Rep. of Germany, Sep. 29, 1987, 3732724
Int. Cl.[4] B60P 7/06; B60T 7/22
U.S. Cl. 180—275 **16 Claims**



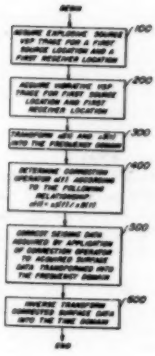
1. A collision-preventing safety arrangement for load-carrying trucks comprising a truck body (2) and a load carrier (3, 4), which is provided at one end of the truck body and is closely spaced above the ground at least when the truck is travelling with a load (20) carried by the load carrier, wherein
said truck body comprises a control pedestal (5) including control means (6) and is provided with a steerable drive wheel (9) and laterally disposed supporting rollers or wheels (10),
said truck body contains energy sources, a travel drive as well as a control circuitry,
a safety device is provided, which in response to a contact with or detection of an obstacle initiates an emergency stopping of the travel drive motor, and
the improvement resides in that
said safety device at least adjacent to said load carrier (3, 4) confines a space which is adapted to contain a load that is carried by the load carrier,
said safety device comprises laterally immovable side bars (15, 16, 28),
said safety device is provided in an elevation within the height range of a human being,
said safety device in an operative position is adapted to retain in said space the load that is carried by the load carrier,
said safety device is arranged to be raised from the operative position in the space containing the load, said safety device permits the load on the load carrier (3, 4) to be moved and handled by means of the load carrier at least toward an end thereof remote from the truck body (2), and
a functional link between the safety device and the travel drive is provided as well as circuitry for disabling the travel drive when the safety device has been raised.

4,893,694

VSP-BASED METHOD AND APPARATUS FOR TIEING SEISMIC DATA SHOT USING DIFFERENT TYPES OF SEISMIC SOURCES

Richard T. Houck, Carrollton, and J. J. Solanki, Plano, both of Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Nov. 14, 1988, Ser. No. 270,710
Int. Cl.[4] G01V 1/36
U.S. Cl. 181—111 25 Claims


BEGIN
ACQUIRE EXPLOSIVE SOURCE VSP TRACE FOR A FIRST SOURCE LOCATION AND A FIRST RECEIVER LOCATION
100
ACQUIRE VIBRATIVE VSP TRACE FOR FIRST SOURCE LOCATION AND FIRST RECEIVER LOCATION
200
TRANSFORM ACQ AND ACQ INTO THE FREQUENCY DOMAIN
300
DETERMINE CORRECTION OPERATOR ACQ ACCORDING TO THE FOLLOWING RELATIONSHIP:
400
CORRECT SEISMIC DATA ACQUIRED BY APPLICATION OF CORRECTION OPERATOR TO ACQUIRED SURFACE DATA TRANSFORMED INTO THE FREQUENCY DOMAIN
500
INVERSE TRANSFORM CORRECTED SURFACE DATA INTO THE TIME DOMAIN
600
END

19. A seismic exploration system comprising:

means for generating a first type of seismic energy into the earth, said first type of seismic energy characterized by a first source waveform;

means for generating a second type of seismic energy into the earth, said second type of seismic energy characterized by a second source waveform different from that of said first source waveform;

means for receiving reflections of said first type of seismic energy off subsurface reflecting interfaces;

means for receiving reflections of said second type of seismic energy off subsurface reflecting interfaces;

means for producing a first VSP data set for the subsurface;

means for producing a second VSP data set for the subsurface;

means for separating downgoing and upgoing wavefields of VSP data;

means for determining a first minimum phase operator for said first VSP from said downgoing wavefield for said first VSP;

means for determining a second minimum phase operator for said second VSP from said downgoing wavefield for said second VSP, said downgoing wavefield for said second VSP being different from that of said first VSP; and

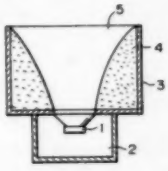
means for applying said first minimum phase operator to said first type of reflections and applying said second minimum operator to said second type of reflections and applying spiking deconvolution to said first and second applied traces to tie said first type of reflections and said second type of reflections together.

4,893,695

SPEAKER SYSTEM

Tadashi Tamura, Kadoma; Shuji Saiki, Hirakata, and Kazue Sato, Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jun. 14, 1988, Ser. No. 206,377
Claims priority, application Japan, Jun. 16, 1987, 62-149646; Nov. 20, 1987, 62-294419; Apr. 28, 1988, 63-106355; May 2, 1988, 63-109343
Int. Cl.[4] H05K 5/00
U.S. Cl. 181—151 13 Claims



1. A speaker system, comprising at least one diaphragm having front and rear surfaces; an acoustic path for guiding sound waves generated on said front surface of said diaphram; a sound absorbing member having an inner surface defining said acoustic path; and a partition member disposed on said inner surface of said sound absorbing member to surround a portion of said acoustic path, whereby said partition member is disposed such that said sound absorbing member is exposed to said acoustic path at at least one part of said sound absorbing member, said at least one part being located at any position of said sound absorbing member except at a region thereof just adjacent said diaphragm.

4,893,696

WORKING CATWALK FOR BRIDGE INSPECTION APPARATUSES

Alfons Moog, Untersiggingen, Fed. Rep. of Germany, assignor to Rita Moog née Schlick, Deggenhausertal, Fed. Rep. of Germany

Filed Jul. 20, 1988, Ser. No. 222,117
Claims priority, application Fed. Rep. of Germany, Jul. 20, 1987, 3723925
Int. Cl.[4] E04G 3/08
U.S. Cl. 182—223 8 Claims

1. A catwalk, comprising:

a central frame section,

a central floor section attached to said central frame section extending a set longitudinal and lateral distance in a horizontal plane,

first and second lateral frame sections each attached to said central section at plurality of pivotal joints, each joint rotatable about an axis perpendicular to said horizontal plane, and said lateral frame sections being movable between a retracted position and an extended position, and

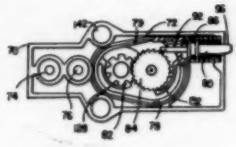
first and second lateral floor sections attached to said first and second lateral frame sections and overlapping said central floor section when said lateral frame sections are in said retracted position.

4,893,697

INJECTION LUBRICATOR WITH PULSE COUNTER

Robert B. Tout, Littleton, Colo., assignor to Watts FluidAir Div. of Robert Shaw Controls Company, Kittery, Me.

Filed Dec. 5, 1988, Ser. No. 280,007
Int. Cl.[4] F16N *13/16*
U.S. Cl. 184—7.4 **23 Claims**



1. An injection lubricator for providing a pulse of lubrication after counting a plurality of pneumatic pulses, said lubricator comprising

a lubricant pump having a pumping piston actuated by a pneumatic pulse to deliver a pulse of lubricant to a lubricant delivery outlet,

a first rotatable counting member that provides a pneumatic pulse to said pump after a fixed number of incremental rotations of said first rotatable counting member,

a second rotatable counting member that carries a displacement member that provides an incremental rotation of said first rotatable counting member after a plurality of incremental rotations of said second rotatable counting member, and

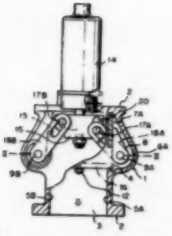
a counting piston that is mounted within a piston chamber to receive pneumatic pulses and to provide an incremental rotation of said second rotatable counting member upon receiving each pneumatic pulse.

4,893,698

EXHAUST BRAKE UNIT EQUIPPED WITH A PAIR OF SWING FLAP VALVES

Ryoichi Suzuki, Mishima, Japan, assignor to USUI Kokusai Sangyo Kaisha, Ltd., Shizuoka, Japan

Filed Jul. 1, 1988, Ser. No. 214,646
Claims priority, application Japan, Jul. 4, 1987, 62-166287
Int. Cl.[4] F02D *9/06*; F22B *21/00*
U.S. Cl. 188—273 **5 Claims**



1. An exhaust brake unit, comprising:

a case defining an exhaust passage therethrough, said exhaust passage having a longitudinal axis, said case including a pair of cavities opening onto said exhaust passage, the openings of said cavities being disposed in facing relation across said exhaust passage, and valve seat means in said exhaust passage disposed substantially normal to said longitudinal axis;

a first shaft rotatably mounted in one of said cavities;

a second shaft rotatably mounted in the other of said cavities;

a first swing flap fixed to said first shaft;

a second swing flap fixed to said second shaft; and

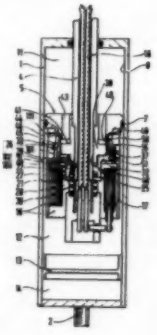
means for moving said first and said second swing flaps between an open position to thereby at least substantially open said exhaust passage and a closed position in which said swing flaps abut with respective portions of said valve seat means to thereby at least substantially block said exhaust passage, said means for moving including means for producing a time lag between the movement of said first swing flap from said closed to said open position and the movement of said second swing flap from said closed to said open position.

4,893,699

SHOCK ABSORBER

Kurt Engelsdorf, Besigheim; Karl-Heinz Hagele, Vaihingen/-Enz; Bernd Taubitz, Schwieberdingen; Quang N. Tran, Stuttgart, and Peter Zieher, Eberdingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Mar. 25, 1988, Ser. No. 172,896
Claims priority, application Fed. Rep. of Germany, Apr. 1, 1987, 3710972; Jan. 14, 1988, 3800864
Int. Cl.[4] F16F *9/35*
U.S. Cl. 188—299 **29 Claims**



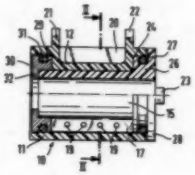
1. A shock absorber particularly for vehicles, which comprises a jacket tube, a cylinder formed by said jacket tube, a piston guided in said cylinder inside said jacket tube, a piston rod secured to said piston, said piston dividing said cylinder into two work chambers, at least one flow connection between said two work chambers by way of which at least a portion of a damping fluid flows back and forth between said two work chambers, an electromagnetic adjusting device including a magnetic coil and an armature confined within said piston, a control slide connected to said armature, said control slide including a first control edge having a plurality of graduated axially extending protrusions and indentations which at any time determine a throttling of a damping fluid inside said at least one flow connection via a plurality of throttling openings, and said control slide (33) is embodied as narrow ian a radial direction on one face end (46) which forms said slide control edge (48).

4,893,700

DAMPING DEVICE, IN PARTICULAR FOR OPERATING MEMBERS IN AUTOMOTIVE VEHICLES

Rainer Gramss, Norderstedt, Fed. Rep. of Germany, assignor to ITW-ATECO, GmbH, Norderstedt, Fed. Rep. of Germany

Filed May 20, 1988, Ser. No. 196,283
Claims priority, application Fed. Rep. of Germany, Jun. 4, 1987, 8707936[U]
Int. Cl.[4] F16F 9/14; E05F 3/04
U.S. Cl. 188—306 11 Claims



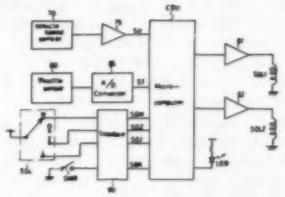
1. A damping device, comprising:
a housing;
a chamber defined within said housing;
a liquid phase medium disposed within said housing chamber;
a shaft extending through said chamber so as to be relatively pivotable with respect to said housing and said chamber defined therein;
at least one radial vane secured to said shaft so as to be relatively pivotable therewith with respect to said housing and said housing chamber, and defining first and second chamber sections within said housing within which said liquid phase medium is disposed:
at least one throughbore defined within said vane so as to permit said liquid phase medium disposed within said first and second chamber sections of said housing to flow between said first and second chamber sections of said housing as said vane is pivotably moved relative to said housing and said first and second chamber sections defined therein during a damping operation;
a first recess means defined within a first end of said housing;
an annular support ring disposed within said first recess means of said housing and having a radially inwardly projecting shoulder portion for seating and supporting a first end of said shaft;
first groove means annularly defined within an outer peripheral surface portion of said annular support ring;
first O-ring means disposed within said first groove means of said annular support ring so as to be interposed between said annular support ring and said first recess means of said housing for sealing said first end of said housing;
a second recess means defined within a second end of said housing;
an annular shoulder portion integrally formed with said shaft for disposition within said second recess means of said housing;
second groove means annularly defined within an outer peripheral surface portion of said shoulder portion of said shaft; and
second O-ring means disposed within said second groove means of said shaft shoulder portion so as to be interposed between said shaft shoulder portion and said second recess means of said housing for sealing said second end of said housing.

4,893,701

CONTROLLING DEVICE FOR AUTOMATIC SPEED CHANGE MECHANISM

Nobuyuki Isono, and Nobuyasu Suzumura, both of Aichi, Japan, assignors to Aisin Seiki Kabushiki Kaisha, Aichi, Japan

Filed Mar. 15, 1989, Ser. No. 323,907
Claims priority, application Japan, Mar. 15, 1988, 63-60945
Int. Cl.[4] B60K 41/26
U.S. Cl. 192—4 A 3 Claims



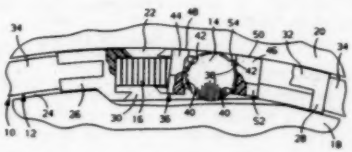
1. A controlling device for an automatic speed change mechanism comprising:
a speed change mechanism adapted to be disposed between an engine of an automobile and an output shaft and adapted to be connected in one of a plurality of modes such as connected states having different reduction ratios and a non-connected state;
a switching means for the connection modes of the said speed change mechanism;
a shift position detection means for emitting electric signals indicating the selection state of a manual shift means for shifting the connection mode of the said speed change mechanism;
a braking detection means for emitting electric signals corresponding to the actuation/non-actuation of a braking device; and
an electronic controlling means for monitoring the electric signals emitted by said shift position detection means and said braking detection means, controlling said switching means corresponding to the selection state of manual shifting means to switch over the connection mode of said speed change mechanism, and during the non-actuation of the braking device, if the manual shifting means commands a switch-over from the non-connected state to a connected state, establishes a connected state having a relatively small reduction ratio compared with the case of brake actuation.

4,893,702

ROLLER CLUTCH WITH COMPACT WEAR REDUCTION MECHANISM

Frederick E. Lederman, Sandusky, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Jun. 28, 1989, Ser. No. 372,488
Int. Cl.[4] F16D 41/06
U.S. Cl. 192—45 3 Claims



1. An overrunning roller clutch of the type that is adapted to be located in the space between a cam race and a coaxially

disposed pathway race, said space being comprised of an evenly spaced plurality of wedging pockets, each extending in one circumferential direction from a wide to a narrow end and separated from one another by a plurality of annular bearing spaces, and in which a cylindrical roller located in each wedging pocket requires a predetermined travel path within its respective wedging pocket as said clutch operates, said clutch comprising,

a cage adapted to be installed between said races including a plurality of journal blocks which substantially fill said annular bearing spaces, thereby accurately maintaining the configuration of said wedging pockets,

a plurality of energizing springs, each of which requires a predetermined spring space in which to operate between a respective wedging pocket wide end and roller first side in order to be capable of continually biasing said roller in said one circumferential direction, toward the narrow end of said wedging pocket, so as to be ready to quickly wedge between said races when said cam race attempts to rotate relative to said pathway race in the opposite circumferential direction, while said cam race may freely overrun relative to said pathway race in said one circumferential direction,

a plurality of roller control blocks, each of which has a central roller receiving pocket located such that a first portion of said block, upon which a respective spring bears, has a circumferential width substantially equal to the wedging pocket space available between said roller travel path and said spring space, while a second portion of said block has a circumferential width substantially equal to the wedging pocket space available between said roller travel path and said wedging pocket narrow end, said roller further being received within said central pocket with sufficient clearance that said control block can be moved radially toward said pathway race sufficiently far that a rubbing surface of said control block portions will contact said pathway race, and,

means for so radially moving each control block radially during overrun so as to engage the rubbing surface of said control block portions with said pathway race with sufficient force to induce a frictional force on said control block in the opposite circumferential direction,

whereby, when said cam race overruns relative to said pathway in said one circumferential direction, each of said control blocks will tend to be moved toward the wide end of its respective wedging pocket by the frictional force induced on it by said pathway race and will consequently tend to move its respective roller toward the wide end of its wedging pocket, opposing its energizing spring while remaining entirely within its wedging pocket, by virtue of the width of said block portions, with the frictional force of said pathway race on said control block ending as said cam race reverses its relative direction.

4,893,703

ELECTROMAGNETIC CONTROL ASSEMBLY AND METHOD FOR A VISCOUS FLUID FAN CLUTCH

Lawrence C. Kennedy, Kettering, and James O. Strader, Spring Valley, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

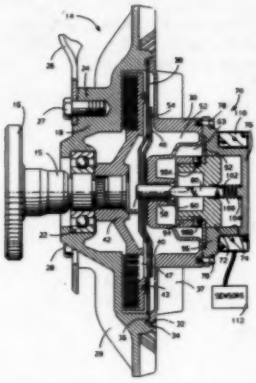
Filed May 22, 1989, Ser. No. 355,536
Int. Cl.[4] F16D *33/12*
U.S. Cl. 192—58 B **4 Claims**

1. An electromagnetic control assembly for a viscous fluid clutch assembly having a rotatable valve plate for controlling the flow of fluid to a shear zone, the control assembly comprising:

(a) a shaft connected to the valve plate;

(b) a ferromagnetic element slidably mounted on the shaft and connected to the shaft so that rotation of the ferromagnetic element is transferred to the shaft;

(c) means for creating a magnetic flux mounted adjacent the ferromagnetic element; and



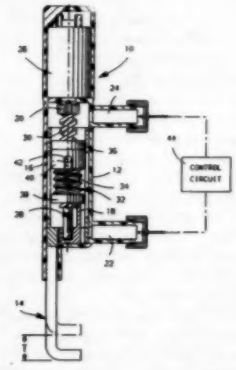
(d) means for rotating the ferromagnetic element as it slides to the flux.

4,893,704

POWER DOOR LOCK ACTUATOR

Timothy J. Fry, Spring Valley, and Lowell T. Greentaner, Huber Heights, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Mar. 27, 1989, Ser. No. 328,992
Int. Cl.[4] E05B *47/00*; F16H *27/02, 29/20*
U.S. Cl. 192—141 **3 Claims**



1. An actuator for a power door lock system of the type that has a reversible motor and an axially slidable lock rod that is manually movable over a predetermined throw between locked and unlocked positions, said actuator comprising,

a main shaft that has an external first stage thread of one hand and which is turned by said motor,

a secondary shaft that is internally threaded to move axially back and forth on said first stage thread and which has an external second stage thread of the opposite hand,

a drive member that is internally threaded to move axially back and forth on said second stage thread,

first and second bumpers fixed to said secondary shaft so as to define first and second limits of motion of said drive member on said secondary shaft,

first and second fixed stop surfaces defining first and second limits of motion of said secondary shaft on said main shaft, and,

a first catch located on said lock rod so as to be engageable with said drive member when said lock rod is in its locked position, said drive member is at its first limit of motion, and said secondary shaft is at its second limit of motion, thereby defining a power locked-neutral mode of said actuator, and,

a second catch on said lock rod spaced from said first catch by substantially said throw so as to be engageable with said drive member when said lock rod is in its unlocked position, said drive member is at its second limit of motion, and said secondary shaft is at its first limit of motion, thereby defining a power unlocked-neutral mode of said actuator,

whereby, if said motor runs in one direction when said actuator is in said power locked-neutral mode, said secondary shaft moves on said first stage thread in one axial direction to its first limit of motion, thereby moving said lock rod to its unlocked position, after which said drive member moves on said second stage thread to its second limit of motion, and conversely if said actuator is in said power unlocked-neutral mode and said motor runs in the opposite direction, said lock rod thereby being manually movable to the opposite position when said actuator is in either neutral mode without substantial resistance.

4,893,705

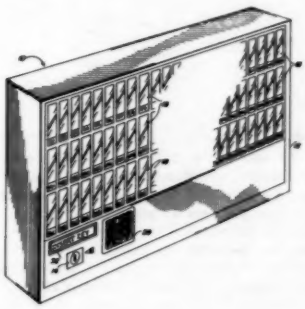
VENDING MACHINE HAVING PLURAL COMPARTMENTS WHICH ARE INDEPENDENTLY SELECTED AND CONTROLLED

Leonard C. Brown, Penthouse, Warner Doone Flats, Warner Beach, Durban, Natal, South Africa

Division of Ser. No. 129,967, Dec. 4, 1987, abandoned, which is a continuation-in-part of Ser. No. 745,115, Jun. 17, 1985, abandoned. This application Aug. 1, 1988, Ser. No. 206,225

Int. Cl.[4] G07F 7/02

U.S. Cl. 194—211 **8 Claims**



1. Apparatus for dispensing video cassettes and other articles, comprising:

a cabinet having a plurality of compartments for storing and dispensing video cassettes and other articles, said cabinet arranged so that all of said plurality of compartments may be simultaneously viewed by a customer;

each compartment having an individual, visually transparent and lockable door panel;

first sensing means with each compartment for detecting the presence of an electrically conductive portion of a video cassette or other article which has been correctly inserted therein;

means with each compartment for independently controlling the opening of the corresponding compartment door panel;

second sensing means with each compartment for detecting when the corresponding compartment door panel is open;

compartment selection means operable by a customer for providing an electronic indication representative of a selected compartment;

means for providing an electronic indication representative of the receipt of a customer payment token for the video cassette or other article located in the selected compartment and for verifying the customer payment token;

means for retaining said customer payment token until the customer has properly closed the door panel to the selected compartment following removal of the video cassette or other article; and

electronic circuit means for receiving inputs from said first and second sensing means, said compartment selection means and said customer payment indication means and for selectively operating said compartment door panel opening means for the selected compartment to open only that door panel and permit access by the customer only to the selected compartment, but only if a video cassette or other article having a correct electronically conductive portion is located therein as determined by said first sensing means and only if the door panel for said selected compartment is previously closed as determined by said second sensing means.

4,893,706

MECHANISM FOR THE RECEPTION AND COLLECTION OF COINS IN COIN-OPERATED MACHINES

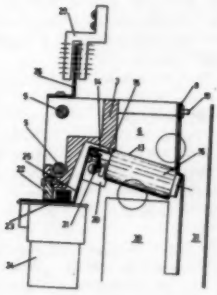
Jesús E. Ibarrola, Navarra, Spain, assignor to Azkoyen Industrial, S.A., Peralta, Spain

Filed Mar. 2, 1988, Ser. No. 163,249

Claims priority, application Spain, Mar. 3, 1987, 8700583

Int. Cl.[4] G07F 1/04, 9/04

U.S. Cl. 194—346 **10 Claims**



1. A mechanism for the reception and collection of coins in coin-operated machines, comprising a frame movable along guides, located immediately below an exit of a coin entry selector of a coin-operated machine; a series of identical vertical chambers including a top and bottom and lateral walls, formed consecutively in the frame by a series of vertical partitions, the chambers being open at said top and bottom, as well as at one of said lateral walls; means for opening and closing the bottom and said one lateral wall of the chambers; frame driving means for moving the frame in a direction perpendicular to the chambers so that the open top of said chambers is successively positioned under the exit of the selector; and means for driving said means for opening and closing the bottom and said one lateral wall of the chamber; said chambers being of a length and height greater than the diameter of a largest acceptable coin and of a width slightly larger than the

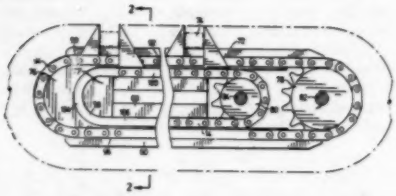
thickness of the largest acceptable coin, a decoder on the frame; a reader stationary with respect to the decoder for reading the decoder to produce information concerning the position of the frame at any given moment; and said means for driving the frame and said means for driving said opening and closing means being controllable by a microprocessor, based on information provided concerning the chamber in which each coin is located and information from the reader concerning the position of the frame at any given moment.

4,893,707

CHAIN CONVEYORS

Marinus J. M. Langen, Toronto, and Peter Gattinger, Milton, both of Canada, assignors to H. J. Langen & Sons Limited, Mississauga, Canada

Filed Nov. 16, 1988, Ser. No. 271,690
Int. Cl.[4] B65G 15/14
U.S. Cl. 198—627 **6 Claims**



1. In a conveyor mechanism for transporting articles along a conveyor path, the conveyor being of the type having first and second conveyor chains which have co-extensive portions of their length which are guided by first and second guide tracks respectively so as to extend along the conveyor path in close proximity to one another, each chain having first and second side edges and first and second load confining members mounted on the first side edges of the first and second chains respectively for movement therewith along the conveyor path, the improvement wherein;

(a) said first guide track is located more closely adjacent the conveyor path than the second guide track and said first and second guide tracks are arranged one above the other in an overlapping relationship with the first side edge of the first guide track being spaced laterally inwardly from the first side edge of the second guide track such that the first and second load confining members are arranged to extend in first and second load confining planes which are laterally spaced from one another by an amount which is less than the lateral width of said second conveyor chain thereby to provide a narrow array of load confining members along an edge of said conveyor path.

4,893,708

CONVEYOR FOR FREEZING FOOD PACKAGES

David G. Machacek, Northfield, Minn., assignor to Northfield Equipment and Manufacturing Co., Inc., Northfield, Minn.

Filed Sep. 20, 1988, Ser. No. 246,636
Int. Cl.[4] B65G 21/18
U.S. Cl. 198—778 **5 Claims**

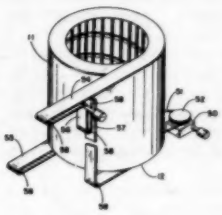
1. In a conveyor system for freezing articles such as food packages comprising a cylindrical core, a generally coaxially arranged cylindrical shell disposed outwardly of said core and with inner and outer walls defining an annular thermal treatment zone therebetween;

(a) a spirally-arranged conveyor platform within said annular zone;

(b) means comprising a plurality of axially and radially spaced apart support arms mounted on one of said walls and supporting said spirally-arranged conveyor platform along a predetermined spiral course through said annular freezing zone;

(c) said support arms being characterized in that:

(1) each of said support arms having an inner end defining a root and an outer end defining a tip and with a certain generally constant height dimension and a generally



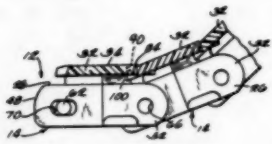
frusto-conical width dimension tapering inwardly from said root to said tip so as to provide a stable support with a low dimensional profile with the loading stresses within said support arm upon normal weighting of said spirally-arranged conveyor platform being generally constant from root to tip.

4,893,709

BACK-FLEXING ARTICLE CARRYING CHAIN

Roger H. Schroeder, Hartland; William G. Hodlewsky, Greendale, both of Wis., and James F. Murphy, Lynchburg, Va., assignors to Rexnord Corporation, Milwaukee, Wis.

Filed Aug. 18, 1988, Ser. No. 234,335
Int. Cl.[4] B65G 17/06
U.S. Cl. 198—852 **11 Claims**



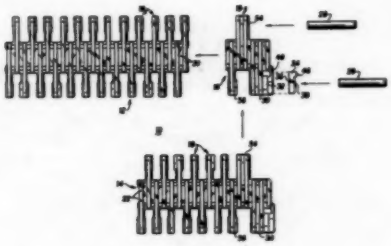
1. A chain link for a chain including a plurality of said links joined to one another in end to end relationship, said link comprising a unitary member including a top plate, a forward knuckle portoin formed below said top plate, and a pairof spaced side bar portoins extending rearwardly from said knuckle portion formed below said top plate, and a pair of spaced side bar portions extending rearwardly from said knuckle portion below said top plate and dimensioned to receive therebetween the knuckle portion of the next following chain link, said chain link being adapted to be included in a chain including a plurality of connecting pins extending through said spaced side bars and said knuckles received therebetween to join adjacent ones of said links and to permit limited pivotal movement between adjacent ones of said links around a substantially horizontal axis extending substantially between adjacent ones of said links and around a substantially vertical axis oriented substantially perpendicularly to said forward and rearward edges including a portion which is beveled from the upper surface downwardly towrd the adjacent link, the other of said forward and rearward edges including a portion which lies in a plane perpendicular to the plane defined by said upper surface of said top plate and which is located so as to move into substantially face to face mating contact with the beveled edgeof the top plate of the next adjacent chain link when adjacent chain links are rotated to a predetermined position around said horizontal axis.

4,893,710

PLASTIC MODULAR CONVEYOR BELTS AND MODULES THEREFOR

Peter K. Bailey, Easton, and Michael L. Spangler, Cambridge, both of Md., assignors to Cambridge Wire Cloth Company, Cambridge, Md.

Filed Jan. 13, 1989, Ser. No. 296,792
Int. Cl.[4] B65G 17/06
U.S. Cl. 198—853 14 Claims



1. A conveyor belt module of the type for constructing a conveyor belt of modules linked together by interfitting link ends and a pivot rod extending through aligned holes in all of the link ends, with means for maintaining the rod captive in the belt by blocking the holes in the outermost of the link ends, the hole blocking means comprising:

(a) an outer edge link end having a slot therein extending perpendicular to the longitudinal axis of the rod, the slot extending past the rod hole in the outermost link end;

(b) a rod movement blocking member shaped to be removably inserted by sliding into the slot; and

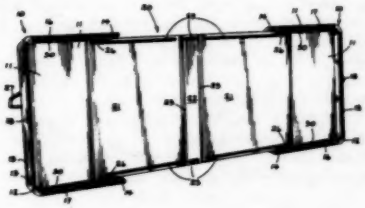
(c) holding means on the blocking member projecting outwardly from the blocking member and cooperating with the rod hole to hold the blocking member in place during operation but to allow manual removal.

4,893,711

CONVERTIBLE CARRYING CASE AND EXPANDABLE EASEL

Everett C. Gustafson, Vancouver, Canada, assignor to Multicard Enterprised Limited, New Westminster, Canada

Filed Mar. 16, 1989, Ser. No. 324,188
Int. Cl.[4] B65D 25/22, 25/28; A45C 9/00
U.S. Cl. 206—45.24 5 Claims



1. A convertible carrying case and expandable easel, comprising:

first and second three-sided trays, each tray having a bottom with oppositely facing inner and outer surfaces, the inner surface of each bottom being partially rimmed by three walls, the walls of the first and second trays having complementary peripheral edges adapted to abut one another when the trays are closed to form an enclosure that is open across one end;

a liner having first and second rectangular panels hinged to a central spine along two parallel hinge axes, said first and second panels and said trays including cooperating means whereby said panels are slidably guided within the first and second trays, respectively, at positions in which the panels are adjacent to the inner surfaces of the tray bottoms for relative movement between them in the planes of the respective panels in directions perpendicular to the hinge axes; and

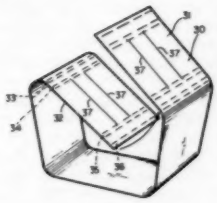
foldable handle means movably mounted on at least one tray for suspending the trays and interconnecting liner while the trays are closed and for alternately supporting the trays in side-by-side positions across the inner while resting in upwardly-open, inclined positions.

4,893,712

CAN PACKAGES

Fred C. Allen, Waterville, and Scott W. Steele, Perrysburg, both of Ohio, assignors to Owens-Illinois Plastic Products Inc., Toledo, Ohio

Division of Ser. No. 106,941, Oct. 14, 1987, which is a continuation of Ser. No. 908,444, Sep. 17, 1986, abandoned. This application Sep. 2, 1988, Ser. No. 239,934
Int. Cl.[4] B65D 7/06, 75/56
U.S. Cl. 206—150 8 Claims



1. A one-piece tubular band of plastic material adapted to be stretched about the periphery of a group of cans,

said band comprising spaced circumferentially extending slits in said band extending longitudinally of said band to form a handle, the length of said slits being such as to span the space between at least a pair of cans such that the fingers can be inserted through one slit in the space between a pair of cans to engage the band and thereafter through the other slit to carry the can package about which the band is stretched.

4,893,713

PROTECTOR PALLET FOR AIRCRAFT WHEEL ASSEMBLIES

William A. Thomas, 2444 Santa Ynez Way, Palm Springs, Calif. 92264

Filed Mar. 3, 1989, Ser. No. 318,607
Int. Cl.[4] B65D 85/06
U.S. Cl. 206—304 16 Claims

1. For aircraft wheel assemblies each including a tire mounted on a hub, a protector comprising:

- an annular lower main protective member including

an annular lower cover having a lower central fastening portion and a protruding portion,

a lower mainly concave wall portion for enclosing bearings and protruding wheel members,

a lower flange portion extending in a radial direction over a lower tire sidewall for enclosing and sealing the hub, for at least partially covering the lower tire sidewall, and for comprising a lower horizontal lifting and stacking surface; and

a centrally secured lower reinforcing member;

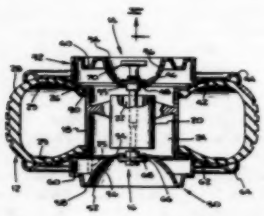
- an annular upper main protective member including

an annular upper cover having an upper central fastening portion and a receiving recess portion for receiving the protruding portion of the lower cover of an adjacent, horizontally stacked wheel assembly;

an upper mainly concave wall portion,

an upper flange portion extending in a radial direction over an upper tire sidewall for enclosing and sealing the hub, for at least partially covering the upper tire sidewall, and for comprising an upper horizontal lifting and stacking surface; and

a centrally secured upper reinforcing member;



- the receiving recess portion and the protruding portion being located at a greater axial distance than the upper and lower flange portions, respectively, for providing an interspace between adjacent horizontally stacked wheel assemblies; and

- clamping means for clamping the protective members to either side of each wheel assembly, the clamping means extending through the upper reinforcing member, through a central bore in the hub, and through the lower reinforcing member, and comprising an externally threaded shaft member, and a tubular shaft member including grasping means and provided for adjustably receiving an upper end of the threaded shaft member, the threaded shaft member being provided with a locking T-member for securely seating in a groove in the lower reinforcing member.

4,893,714

SUPPORT FOR PRINT-OUTS

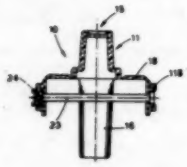
Amos D'Agaro, Udine; Giuliano Cossetti, Tolmezzo, and Elio Capellari, Udine, all of Italy, assignors to Selma Italiana SpA, Tolmezzo, Italy

Filed Feb. 19, 1988, Ser. No. 158,220

Claims priority, application Italy, Jul. 21, 1987, 60411/87[U]

Int. Cl.[4] A47F 7/16

U.S. Cl. 211—46 **10 Claims**



1. A support for print-outs which is suitable to bear print-outs along the axis of the support itself (10), comprising: a generally rectangular central body having terminal ends, sides and a center and further (11) having support attachments (12,13) located longitudinally at said terminal ends and center for facilitating hanging the support, a handle (14) on said central body for carrying the support, side panels (17) located symmetrically at the sides and along the length of the central body (11), the central body (11) including at least one terminal limiting means (16) for positioning print-outs longitudinally within the support, each of the side panels (17) including an inner portion (18) adjacent the central body and an outer portion (118) adjacent the inner portion and spaced from the central body, the inner portion being pivotally connected to the central body for pivotal movement thereabout, and the outer portion being pivotally connected to the inner portion for pivotal movement thereabout.

4,893,715

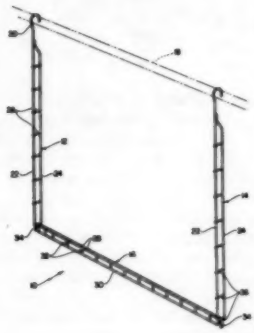
CLOSET EXTENDER

John Papazian, New Rochelle, and William Kiernan, Larchmont, both of N.Y., assignors to Lillian Vernon Corporation, Mount Vernon, N.Y.

Filed Jan. 9, 1989, Ser. No. 295,199

Int. Cl.[4] A47F 5/00

U.S. Cl. 211—118 **4 Claims**



1. A closet extender comprising first and second elongated frame members adapted to be suspended from a substantially horizontal closet pole so that they extend downwardly therefrom in substantially parallel spaced relation and an elongated support member adjustably securable to said frame members at a plurality of different locations wherein it extends therebetween in a substantially horizontal disposition in downwardly spaced relation to said closet pole, said support member being adapted for suspending a plurality of clothes hangers therefrom, said frame members each having upper and lower ends and each comprising a pair of spaced, substantially parallel, substantially rigid, longitudinal frame wire elements, a plurality of spaced, substantially parallel, substantially rigid connecting frame wire elements extending between the longitudinal frame wire elements thereof, and a hook element at the upper end thereof, said hook elements being receivable on said closet pole for suspending said frame members therefrom, said support member comprising support hook means at the opposite ends thereof, each of said support hook means being releasably received in engagement on a transverse connecting frame wire element of a different frame member for releasably supporting said support member on said frame members.

4,893,716

CLAW COUPLING FOR TOY AND MODEL TRAINS

Hans Diller, Heroldsberg, Fed. Rep. of Germany, assignor to Gebr. Fleischmann, Nuremburg, Fed. Rep. of Germany

Filed Aug. 23, 1988, Ser. No. 235,346

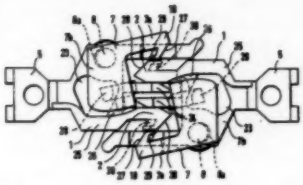
Claims priority, application Fed. Rep. of Germany, Aug. 25, 1987, 3728240

Int. Cl.[4] B61G 1/00

U.S. Cl. 213—75 TC **7 Claims**

1. A claw coupling for toy model trains comprising a . cou-

pling support head having hook means, claw means, pivotal means pivotably mounting said claw means on said coupling support head for a movement between a coupled and an uncoupled position, a decoupling pin depending from said claw means, said coupling support head having opening means in which said decoupling pin is received, said decoupling pin being free to move in said opening means, said claw means having two arms disposed generally at right angles to one another, one of said arms having said hook means, the other of



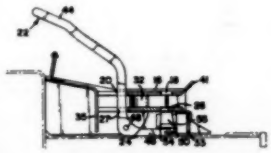
said arms having said depending decoupling pin, said coupling support head having a mandrel operable to be disposed in a position juxtaposed to the other of said arms of a claw means of another like coupling to preclude the last said claw means from pivoting to a decoupling position, said pivotal means comprising a pivot pin extending from said claw means and a hole in said coupling support head in which said pivot pin is received, said hole having at least a partial conical surface to prevent said pivot pin from being wedged in said hole as said pivot pin is moved axially in said hole.

4,893,717

TRAILER HITCH FOR USE WITH A RAILROAD CAR

William K. Berry, Arlington, Tex., and Gary S. Kaleta, Warren, Oreg., assignors to Burlington Northern Railroad, Fort Worth, Tex.

Filed Jan. 27, 1989, Ser. No. 303,469
Int. Cl.[4] B61G *1/28*
U.S. Cl. 213—188 **17 Claims**



17. A hitch for releasably connecting a double stack trailer to a road railer car having a tongue having an opening, comprising:

(a) a top wall, bottom wall, back wall, and first and second side walls cooperatively connected to form a housing for receiving the tongue of the road railer car, the housing having a generally circular upper pin receiving opening in the top wall, and a generally circular lower pin receiving opening in the bottom wall, the pin receiving openings in alignment, the side walls extending below the bottom wall and having a forward portion generally flared outward so as to provide a guider for the tongue and a backward portion, wherein the forward portion is positioned between the top wall and the bottom wall, the back wall positioned between the top and bottom walls;

(b) a shaft positioned below the bottom wall and cooperatively connected between the first side wall and the second side wall;

(c) a lever having an upper arm cooperatively connected to a lower arm and a pivot point positioned between the arms, the lever having a portion of the upper arm extending above the top wall, and the lower arm positioned below the bottom wall, the top wall having a first slot sized and configured to correspond to the lever which provides an area in which the lever travels, the bottom wall having a second slot sized and configured to correspond to the lever which provides an area in which the lever travels;

(d) a generally frusta-conical shaped pin cooperatively connected to the lower arm, the pin having engaged and disengaged positions, whereby when in the disengaged position the pin is in the lower pin receiving opening and in the engaged position when the upper arm is depressed and the pin moves upward through the upper pin receiving opening thereby securing the tongue through its opening which has been positioned in the housing;

(e) a pin carrier cooperatively connected to the pin;

(f) four pin guides cooperatively connected to the side walls thereby providing a guide for the pin carrier;

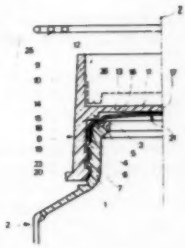
(g) a bracket cooperatively connected to the housing, the bracket having an opening sized and configured to receive the lever, and a latch means for securing the lever into the bracket.

4,893,718

CONTAINER WITH WELDED ON COVER AND SCREW CAP

Frédéric Delespaul, and Bernard Schneider, both of Sainte-Ménéhould, France, assignors to CEBAL, Clichy, France

Filed Nov. 22, 1988, Ser. No. 274,953
Claims priority, application France, Dec. 23, 1987, 87 18527
Int. Cl.[4] B65D *41/62*
U.S. Cl. 215—232 **6 Claims**



1. A pack comprising:

a tube having an externally threaded, plastic neck;

an internally threaded, plastic cap which can be fixedly screwed onto the neck; and

a cover which can be welded over the end of the neck while it is held in place by said cap fixed onto the neck, said cover being generally circular, of a diameter substantially equal to the outside diameter of the end of the neck, having at least one radially projecting tab used for removal of the welded cover from the neck, being deformable with little or no springback effect, and comprising at least two external plastic-based layers and at least one barrier layer therebetween; wherein

said cap has a closed end abutted internally by a peripheral shoulder for pressing the cover over the end of the neck, said shoulder having an inside diameter between the inside and outside diameters of the neck, said closed end thereby being recessed so as not to press said cover onto any burr which may be at the end of the neck, the circular portion of the cover straddling any such burr without danger of bursting; and

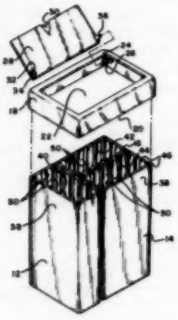
fixing said cap to said neck forms a space between the outside of the neck and the inside of the cap below the shoulder, said space for containing said at least one tab bent back along the neck.

4,893,719

COMPARTMENTALIZED SEPARATING CONTAINER

John J. Lombardi, Marlton; Michael Handline, Williamstown, both of N.J., and Gary Goode, Davie, Fla., assignors to T and C Associates, Williamstown, N.J.

Filed Jul. 11, 1988, Ser. No. 217,164
Int. Cl.[4] B65D *21/02*
U.S. Cl. 220—1 T 31 Claims



1. A compartmentalized container to allow separation of different types of material and allow the segregated material to be disposed of separately, the compartmentalized container comprising:

(a) at least two separate containers, each container comprising:

(i) an open, generally unobstructed top,

(ii) vertical side walls, each terminating at an upper edge,

(iii) a closed bottom, and

(iv) a sufficient size and shape that the containers are nestable together so that the upper edges not abutting another upper edge form a periferial shape of an outer edge shape,

(b) an integral frame member coextensive with the outer edge shape comprising a depending edge over the outer edge shape sized to hold the nested containers together,

(c) a top cover means to integrally cover the combined nested tops of the containers, and

(d) hinge means to hingeably attach the top cover means to the device to allow the top cover means to hingeably uncover and cover the combined tops of the nested containers.

4,893,720

TILTING SANITARY TANK

Edward F. McKiernan, Big Prairie, and Carl E. Bochmann, Brecksville, both of Ohio, assignors to Sealand Technology, Inc., Big Prairie, Ohio

Continuation-in-part of Ser. No. 252,797, Sep. 30, 1988, abandoned. This application Feb. 21, 1989, Ser. No. 312,169
Int. Cl.[4] B65D *90/00*
U.S. Cl. 220—5 A 22 Claims

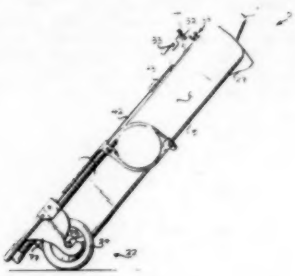
1. A transportable tank system for handling waste water and the like, comprising:

a tank body having first and second opposite ends, and first and second opposite faces between said first and second ends;

discharge valve means provided in said tank first face for selectively providing or preventing fluid communication between the interior of the tank and the exterior thereof;

wheel means provided at said first end of said tank for mounting said tank for rolling movement; and

tilting means operatively connected to said tank for mounting said tank for tilting movement from a first position, in which said tank is transportable by said wheel means with said wheel means engaging the ground and supporting said tank, to a second position in which said wheel means do not support said tank, and said discharge valve means



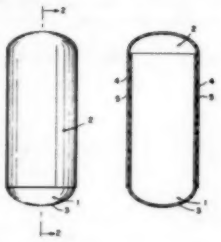
is elevated with said first face extending substantially horizontally so that it may be disposed directly over a toilet to discharge the contents of the tank into the toilet.

4,893,721

TAMPER-PROOF CAPSULES

Hans U. Bodenmann, Muenchenstein, Switzerland; Steven A. Roberts, Greenwood, S.C., and Fritz Wittwer, Lupsingen, Switzerland, assignors to Warner-Lambert Company, Morris Plains, N.J.

Continuation of Ser. No. 438,148, Oct. 29, 1987, abandoned. This application Nov. 21, 1984, Ser. No. 674,348
Int. Cl.[4] B65D *43/10*; A61B *19/02*
U.S. Cl. 220—8 4 Claims



1. A hard shell capsule comprising cylindrical, telescopically and frictionally joinable, co-axial cap and body parts, each of said parts having a side wall, an open end and a closed end, wherein the side wall of each of said parts has substantially the same length and said side wall length is substantially greater than said capsule diameter, the closed end of said body part being shaped to resist gripping and, when telescopically joined, the side all of said cap part encases the entire side wall of said body part forming a tamper-proof capsule, whereby the side wall of said body part is prevented from being griped.

4,893,722

COMPARTMENTED WASTE RECEPTACLE

Gregory H. Jones, 2300 W. Norwegian St., Pottsville, Pa. 17901

Filed Aug. 5, 1988, Ser. No. 228,525
Int. Cl.[4] B65D *21/02*
U.S. Cl. 220—1 T 9 Claims

1. A compartmented waste receptacle for segregating different types of waste comprising:

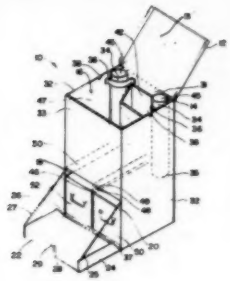
a bottom including two side walls and a back wall extending upwardly therefrom;

said bottom further including a lower compartment lid having a first end and a second end, said second end being pivotally secured to said bottom;

a base positioned above said bottom such that the distance between said base and said bottom is less than the distance between said first and second ends of said lower compartment lid;

said base extending between said two side walls and said back wall and further including a front wall extending upwardly therefrom to substantially the same height as said other walls;

said base further including a first aperture positioned adjacent one of said side walls and said back wall and a second



aperture positioned adjacent the other of said side walls and said back wall;

said apertures being surrounded by a chute which extends upwardly therefrom to the same height as said walls;

a first and a second lower compartment container each disposed between said base and said bottom and positioned beneath said first and second apertures, respectively; and

an upper compartment lid pivotally secured to an upper edge of one of said walls.

4,893,723

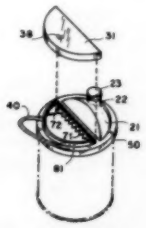
PAINT CAN ATTACHMENT

John K. Seabolt, 405 Jones Chapel Rd., Richlands, Va. 24621

Filed Jun. 28, 1988, Ser. No. 212,585

Int. Cl.[4] B65D *25/00*

U.S. Cl. 220—85 SP **7 Claims**



1. An apparatus for attachment to a rim at the top of a cylindrical container for liquids, comprising:

means for removably attaching and sealing said apparatus to the rim of said cylindrical container;

a pour spout having a pour aperture at the end of said pour spout;

removable cap means adapted to close said pour aperture;

said apparatus including an access aperture therein, said access aperture defining a semicircular configuration;

a cover for said access aperture; and

a slot defined by a portion of the edge of said access aperture, said slot providing a squeegee, whereby said squeegee may engage and scrape liquid from both sides of a stir paddle simultaneously, and alternatively retain a stir paddle in a vertical position.

4,893,724

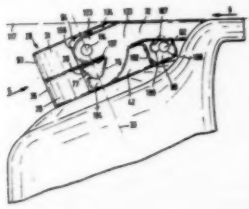
CLOSURE FOR A CANISTER

Wolfram Schiemann, Eugen-Nagele Str. 17, D-1740 Ludwigsburg, Fed. Rep. of Germany

Filed Jun. 6, 1988, Ser. No. 202,969

Int. Cl.[4] B65D *43/26*

U.S. Cl. 220—263 **38 Claims**



1. A closure for a plastic canister in the 20–30 liter range, said canister having integral therewith a plastic pouring spout with an end face,

said closure comprising

a collar coaxial with said pouring spout, having a rearward periphery and sides having two abutments, said abutments having lower surfaces arranged to cooperate with claws of a claw-type closure,

a cap with a sealing ring therein and lateral and rearward edge regions, said cap being arranged to swing between an open condition and a closed condition relative to said collar,

a first hinge half projecting from said rearward periphery of said collar,

a second hinge half on said rearward edge region of said cap that cooperates with said first hinge half,

said first and second hinge halves being shaped to prevent said cap from swinging to said closed condition when said cap is in said open condition,

two journals arranged on said lateral edge regions of said cap, and

a claw that is approximately U-shaped, seen in plan view, with a transverse gripping web with end regions, and two longitudinal webs emanating from said end regions,

each of said longitudinal webs ending at a free end in a fork having an upper and a lower prong as seen in said closed condition of said cap,

each of said upper prongs being arranged to form a swivel hinge with said journals,

each of said lower prongs having an inner surface arranged to cooperate with said lower surfaces of said abutments such that when said gripping web is pressed downward said sealing ring in said cap is pressed onto said end face of said pouring nozzle,

said collar being arranged to fit against said cap with minimal spacings and said claw being arranged to fit against said collar and said cap with minimal spacings, when said cap is in said closed condition, said spacings permitting relative movement of said claw and said cap during opening and closing of said cap, said spacings being smaller than deformations occuring as a result of impact loads on said closure,

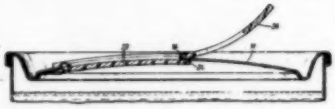
said claw being composed of plastic.

4,893,725

METHODS OF MAKING METAL CAN ENDS WITH PLASTICS CLOSURES

Martin F. Ball, Wantage; Andrew P. Pavely, Blunsdon, and Joseph S. Taylor, Long Wittenham, all of England, assignors to CMB Packaging (UK) Limited, Reading, England

Continuation-in-part of Ser. No. 163,186, Feb. 25, 1988, Pat. No. 4,813,837, Continuation of Ser. No. 906,887, Sep. 15, 1986, abandoned. This application Jul. 8, 1988, Ser. No. 216,473
Claims priority, application United Kingdom, Sep. 20, 1985, 8523263
The portion of the term of this patent subsequent to Mar. 21, 2006, has been disclaimed.
Int. Cl.[4] B65D *17/34*
U.S. Cl. 220—269 25 Claims



1. A metal can end comprising a peripheral flange, a peripheral wall inboard of the peripheral flange, and a central panel inboard of the peripheral wall; a flange extending from the plane of the central panel and defining an aperture therein; said aperture being closed by a closure formed of nylon or polypropylene in situ injection-moulded upon said central panel; said moulded closure including a top surface defining an exterior flange and a pull tab; a plug portion of said moulded closure obturating said aperture; an inner flange of said closure holding said closure in interlocked engagement with said aperture defining flange; said plug portion being adhered to a plastics coating on an interior surface of said central panel; said aperture-defining flange being a generally peripheral wall extending substantially transverse to the plane of the central panel; said aperture-defining flange terminating in a burr directed laterally relative to said aperture; said inner flange having a residual portion set-off between a terminal edge of said aperture-defining flange and an interior surface of said inner flange; said residual portion covering said terminal edge and being in the range of 0.125 mm to 0.5 mm; said residual portion having an opening forming starting end and a last-to-open end remote from said pull tab; said residual portion having a greater thickness at said last-to-open end than at said starting end; and said interior surface plastics coating being a polymer similar to that of said plug closure whereby said plug closure and interior surface coating are bonded and fused into sealing engagement upon the in situ injection-moulding of said moulded closure.

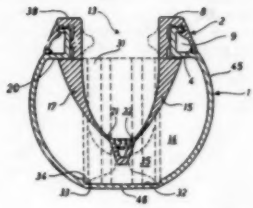
4,893,726

CONTAINER FOR CONTROLLED RELEASE OF A PREFERABLY LIQUID MEDIUM

Steen Vesborg, Bruxelles, Belgium, assignor to Colgate-Palmolive Company, Piscataway, N.J.

Filed Jul. 20, 1988, Ser. No. 221,700
Int. Cl.[4] B65D *47/00*
U.S. Cl. 220—403 14 Claims

1. A locking apparatus adapted for coupling to a container including a flange part which extends inwardly in a radial direction to define a container opening, the flange part having an inner surface, the container opening being centered on a longitudinal axis normal to the radial direction, the locking apparatus comprising a locking insert removably inserted in the container opening, the locking insert including a counterpart fitted within said container opening, a locking part, and an insert opening, said locking part including a first blade having one end which is swingably hinged by a first hinge part to said counterpart, and another end thereof hingably joined by a second hinge part to a connection body positioned in said insert opening, said one end of said first blade having an abutting surface, and said connection body being being movable longitudinally along said axis between first and second stable positions, so that when said connection body is in said first stable position, said abutting surface of said one end of said first blade extends radially inward of said container opening, thereby allowing insertion of said locking insert in said container opening, and when said connection body is moved to said second stable position, said first blade swings on said first and second hinge parts to extend said abutting surface radially outward and in abutment against said inner surface of said flange part, thereby locking said locking insert in said container opening.

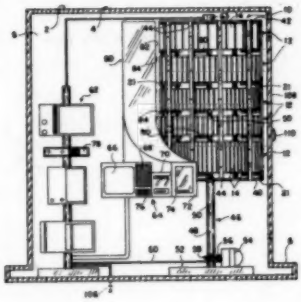


4,893,727

AUTOMATED RETAIL SERVICE DELIVERY SYSTEM

Michael A. Near, 10101 Tuxford Rd., Richmond, Va. 23236

Filed Aug. 8, 1988, Ser. No. 229,465
Int. Cl.[4] G07F *11/00*
U.S. Cl. 221—81 10 Claims



1. An automated delivery system comprising:
a wheel assembly including a plurality of circular tiers,
each said tier provided with a plurality of storage bins adapted to contain a product to be dispensed,
each said bin having a gate assembly displaceable between an open and a closed position,
horizontal bin support means beneath said bins of each said tier,
means interlocking said tiers into a unitary assembly,
wheel assembly support means engageable with and maintaining said wheel assembly at a fixed elevation,
a delivery chute adjacent the outer periphery of said wheel assembly,
indexing motor means operable to rotate said wheel assembly to position a selected one of said bins on any said tier juxtaposed said delivery chute,
discharge motor means on each said tier operable to displace any one said bin gate assembly on its respective tier, whereby upon displacement of any one said gate assembly, any product within the respective said bin is directed into said delivery chute,

said gate assembly includes a lever pivotally attached to each said bin, and

said lever and discharge motor means are provided with cooperating cam surfaces.

4,893,728

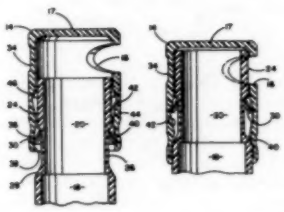
ARTICLE DISPENSER

Paul D. Jennings, 1039 E. Almond Ave., Orange, Calif. 92666, and Kenneth L. Jennings, P.O. Box 83-4, Rte. 2, Strafford, Mo. 65757

Continuation of Ser. No. 24,847, Mar. 17, 1987, abandoned, which is a continuation of Ser. No. 781,040, Sep. 27, 1985, abandoned. This application Jul. 14, 1988, Ser. No. 218,470

Int. Cl.[4] B65D *41/18*

U.S. Cl. 221—306 **13 Claims**



1. An article dispenser for containing a plurality of articles and providing a path for dispensing said articles upon selective actuation of said article dispenser, comprising:

a container member having a compartment for containing said articles, said container member having a dispenser portion including a first aperture through which said articles may pass; and,

a dispenser control member relatively displaceable with respect to said container member, said dispenser control member having a second aperture, said container member dispenser portion including a ring member of tubular contour, said ring member defining flexible means for positive engagement between said container member and said dispenser control member, said flexible means including a plurality of discrete flexible protrusions, said discrete flexible protrusions being radially displaced upon displacement of said container member and said dispenser control member, said dispenser control member having an internally inclined surface for contiguous interface with said flexible protrusions upon displacement of said dispenser control member and said container member, said flexible protrusions and inclined surface providing a varying force during radial displacement of said discrete protrusions.

4,893,729

SELECTABLE MIXING BOTTLE

Jerry R. Iggulden, 21600 Cleardale St., Newhall, Calif. 91321, and Donald A. Streck, 832 Country Dr., Ojai, Calif. 93023, assignors to Jerry R. Iggulden, Santa Clarita and Donald A. Streck, Ojai, both of, Calif., a part interest to each

Filed Jul. 8, 1988, Ser. No. 216,289

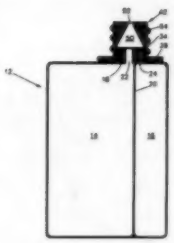
Int. Cl.[4] B67D *5/22*

U.S. Cl. 222—42 **5 Claims**

1. A bottle for holding, mixing, and dispensing a mixture of two liquid components comprising:

(a) a plastic bottle having two compartments for containing respective ones of the two liquid components and having a cylindrical neck at the top thereof containing a first bore therethrough concentrically disposed in said neck and communicating with one of said compartments and a second bore therethrough peripherally disposed with respect to said first bore and communicating with the other of said compartments, one of said two compartments being a chamber for holding a lotion, the other of said two compartments being a chamber for holding an active ingredient for imparting variable qualities to a mixture of said lotion and said active ingredient;

(b) a generally cylindrical mixing chamber member disposed over said neck, said mixing chamber member having an internal mixing chamber communicating with said first and second bores on a bottom end thereof and having a third bore therethrough at a top end thereof for the egress of the two liquid components following their being squeezed from said two compartments through said first and second bores into said mixing chamber, said mixing chamber member further having threads formed on an outer surface thereof for removably receiving an internally threaded cap, said first bore being sized for passing known quantities of said lotion, said second bore being



sized in relation to said first bore so as to add a quantity of said active ingredient which will impart a pre-selected quality to dispensed quantities of mixtures of said lotion and said active ingredient; and additionally,

(c) means for adjusting the size of said second bore comprising a selector dial rotatably mounted on said neck, said selector dial having a central cap portion covering said neck over which said mixing chamber member is disposed, said central cap portion having a central bore through a top member thereof concentrically disposed over said first bore and a plurality of various diameter metering bores disposed peripherally through said top member concentrically disposed to pass over said second bore as said selector dial is rotated on said neck whereby the quantity of said active ingredient and thereby the quality of dispensed quantities of mixtures of said lotion and said active ingredient are adjustable.

4,893,730

AEROSOL DISPENSER FOR DUAL LIQUIDS

Lee R. Boldue, 6416 Gainsborough Dr., Raleigh, N.C. 67612

Filed Jul. 1, 1988, Ser. No. 214,477

Int. Cl.[4] B67B *7/24*

U.S. Cl. 222—80 **25 Claims**

1. An aerosol dispenser comprising: a container having a deformable side wall and an internal chamber for storing a propellant and at least one first component to be sprayed therefrom, normally closed valve means mounted on said container

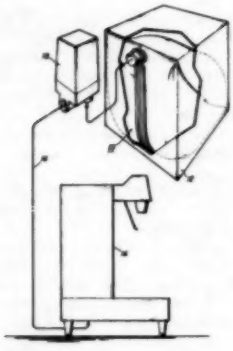
to retain the propellant and component in said chamber, said valve means being movable to an open position to dispense aerosol to a desired location, frangible ampule means located within said chamber containing a second component that is separated from the first component within the chamber until said ampule means is broken, means for holding the ampule means in said chamber adjacent a portion of the side wall of the container, said means for holding the ampule means in said chamber includes means having a loop surrounding a portion of the ampule means to hold said ampule means in said chamber adjacent said portion of the side wall, a first arm, and a second arm positioned in engagement with the inside of said side wall, said loop having ends joined to the first and second arms, said ends spacing the ampule means from said portion of the side wall, and means mounted on said container engagable with said portion of the side wall and operable to deform said portion of the side wall toward the ampule means to break said ampule means thereby releasing the second component into said chamber.

4,893,731

COLLAPSIBLE BAG WITH EVACUATION PASSAGEWAY AND METHOD FOR MAKING THE SAME

Simon J. Richter, Marietta, Ga., assignor to The Coca-Cola Company, Atlanta, Ga.

Filed Dec. 20, 1988, Ser. No. 287,187
Int. Cl.[4] B65D *35/00*
U.S. Cl. 222—92 **29 Claims**



1. A collapsible bag for use in containing and dispensing a liquid comprising:

(a) a liquid tight bag having a flexible bag wall;

(b) a spout attached to said bag wall and having a spout opening therethrough in liquid communication with the inside of said bag;

(c) an elongated reinforcing strip sealed to an outside surface of said bag wall and extending from adjacent to said spout to a position remote from said spout; and

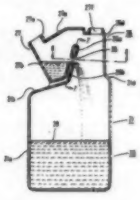
(d) said reinforcing strip including at least one elongated groove therein which also exists in the portion of said bag wall attached to said reinforcing strip, said groove providing at least one elongated liquid passageway inside of said bag in liquid communication with said spout opening, said at least one passageway having a depth and a width such that as said bag wall collapses during dispensing of liquid from the bag, the bag wall can not collapse into and block said passageway, such that said passageway remains open to achieve complete withdrawal of liquid from said bag as said bag collapses.

4,893,732

EXACT VOLUME DISPENSING CONTAINER

J. T. Jennings, Mountainside, N.J., assignor to Container Mfg. Inc., Middlesex, N.J.

Filed Jun. 12, 1989, Ser. No. 364,180
Int. Cl.[4] G01F *11/26*
U.S. Cl. 222—109 **4 Claims**



1. In a dispensing container, comprising: a primary storage container for storing liquid and a measuring head having a pour-out spout with a removable closure disposed above said primary storage container, a neck disposed between said primary storage container and the base of said measuring head, a modified pour-spout at the side of said measuring head, said modified pour-spout comprising a tube formed by a barrier connected at its lower end at said neck, said barrier being spaced-apart from said pour-out spout whereby said tube receives liquid from said storage container and transports said liquid to said measuring head through a passage at the upper end of said tube adjacent the side of said measuring head opposite to said pour-out spout for measuring said liquid when said container is first tilted and then righted and dispensing said liquid from said measuring head through said pour-out spout when said closure is removed and said container is again tilted, the improvement wherein:

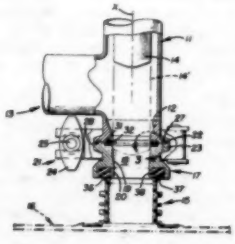
a drainback opening is interposed through said barrier for connecting the interior of said measuring head to the interior of said tube at a level below the upper end of said tube for draining liquid above a preselected level stored in said measuring head back through said drainback opening into said primary storage container, whereby the level of liquid to be dispensed from said measuring head is equal to the exact volume stored in said measuring head.

4,893,733

FILLING HEAD WITH QUICK-CHANGE NOZZLE

Peter N. Thomsen, 138 Baumont Ave., San Francisco, Calif. 94118

Filed Nov. 22, 1988, Ser. No. 274,821
Int. Cl.[4] B65B *55/08*
U.S. Cl. 222—153 **12 Claims**



1. A filling head for communicating a liquid product through

a generally cylindrical gland, defining an annular bearing surface on an upper end thereof, said filling head comprising

a fill tube having an outlet at a distal end thereof,

an inlet conduit communicating with said fill tube for supplying said liquid product thereto,

piston means reciprocally mounted in said fill tube for movement between a raised position for permitting said product to flow from said inlet conduit through the outlet of said fill tube and a lowered position blocking flow of said product from said inlet conduit through the outlet of said fill tube,

an annular nozzle having a proximal end positioned at the distal end of said fill tube and defining a flow passage therethrough communicating with the outlet of said fill tube,

attachment means for releasably attaching the proximal end of said nozzle to the distal end of said fill tube, and

annular sealing means secured on a distal end and bottom side of said nozzle for engaging the annular bearing surface of said gland in sealing contact therewith.

4,893,734

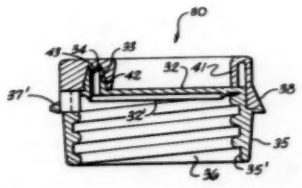
RESEALABLE CLOSURE AND CONTAINER EMPLOYING SAME

Walter K. Chlystun, 327 St. James Dr., Spartanburg, S.C. 29302

Filed Aug. 24, 1988, Ser. No. 235,541

Int. Cl.[4] B67B 5/00

U.S. Cl. 222—153 25 Claims



1. An improved closure for a dispensing container comprising a top wall, a skirt secured to said top wall and depending downwardly therefrom, said skirt being adapted to be removably securable to a portion of a container about which is to be received, said top wall defining a vent opening therein, a cap hingedly secured to a portion of said closure, said cap residing over said top wall in a closed position and being moveable about said hinge connection to an open position, said cap having means for closing said vent opening when in the closed position and having means thereon matable with a portion of said closure for removably locking said cap in the closed position, said closure further having means thereon matable with a portion of a container on which said closure is to be received when said cap is in the closed position only to preclude removal of said closure from said container.

4,893,735

APPARATUS FOR CONTROLLING HYDRAULIC JACKS MOUNTED ON A ROTARY HOPPER

Emile Lonardi, L-Bascharage, Luxembourg, assignor to Paul Wurth S.A., Luxembourg

Filed Mar. 16, 1988, Ser. No. 168,902

Claims priority, application Luxembourg, Mar. 24, 1987, 86823

Int. Cl.[4] B67D 5/64

U.S. Cl. 222—168 10 Claims

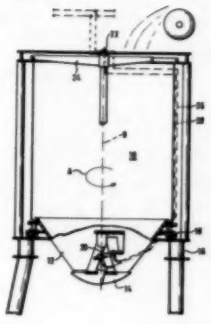
1. An apparatus for controlling hydraulic jacks, comprising:

a support member;

a rotary hopper, rotatably mounted on the support member, said hopper having an outer wall and a bottom portion;

a plurality of hydraulic jacks mounted directly on the rotary hopper;

a hydraulic unit mounted directly on said outer wall of the bottom portion of said hopper, said hydraulic unit including means for supplying hydraulic fluid to said hydraulic jacks; and



energy source means for actuating said hydraulic unit, said energy source means located adjacent to said bottom portion of said hopper, but being independent from said bottom portion.

4,893,736

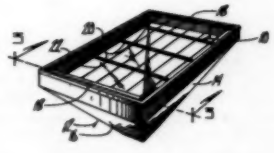
GRAIN WAGON BOX WITH SAFETY GRID

Charley B. Naig, P.O. Box 283, Graettinger, Iowa 51324

Filed May 16, 1988, Ser. No. 194,331

Int. Cl.[4] E04C 2/42

U.S. Cl. 222—185 16 Claims



1. A grain wagon box having opposite end walls and side walls and a bottom center discharge opening wherein the improvement comprises,

a safety grid structure positioned over at least the substantial center area of said box over said center discharge opening and which is detachably secured to at least the opposite side walls of said box whereby direct human access to said center discharge opening from the top of said box is prevented without interfering with the flow of grain through said grid,

said grid including a plurality of cross members connected to said wagon side walls and a plurality of longitudinal members interconnecting said cross members, and

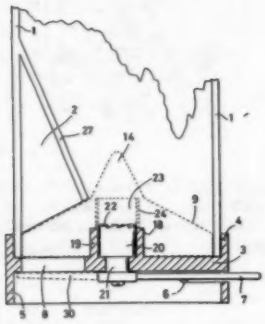
each of said cross members having one end being secured to one side wall of said box by a bolt extending through one of said side walls and being connected to said cross member by a bracket means longitudinally movably connected to said cross member for said grid to fit in boxes of varying size with only the outer end of the bolt being exposed on the outside of said box and the remainder of said bolt extending along the length of said cross member inside said box.

4,893,737

DISPENSING APPARATUS

Hans Borjesson, Hestra, Sweden, assignor to AB Ersol, Hestra, Sweden

PCT No. PCT/SE86/00423, § 371 Date Jun. 30, 1987, § 102(e) Date Jun. 30, 1987, PCT Pub. No. WO87/02013, PCT Pub. Date Apr. 9, 1987
PCT Filed Sep. 22, 1986, Ser. No. 54,566
Claims priority, application Sweden, Sep. 25, 1985, 8504424
Int. Cl.[4] G01F 11/10
U.S. Cl. 222—360 4 Claims



1. A dispensing apparatus for dispensing pulverent goods such as ground coffee, comprising:

a container for receiving the goods and having a bottom with a discharge opening therein,

a rotor rotatably provided in the container and covering substantially the whole bottom thereof, said rotor having a number of radially extending vanes defining compartments therebetween for receiving the goods,

a drive mechanism for rotating said rotor in rotational steps which each correspond to the length of one compartment, said drive mechanism being operable to move the rotor to a plurality of stop positions which are located as to place consecutive compartments of the rotor in registration with said discharge opening,

said rotor having a bore in its center, said drive mechanism including an upper coupling member which is axially slidable but non-rotatable in said bore, a lower coupling member connected to an operating lever and being provided with teeth, said upper coupling member having a member of teeth for engaging corresponding teeth on the lower coupling member, the teeth being operable to connect the two coupling members rotationally together when the lever is being pivoted in one direction to advance the rotor one step but to disengage the upper coupling member by axially lifting it when the lever is pivoted in the other direction,

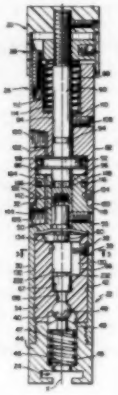
a wiper means fastened to said container and covering a portion of the rotor in the region of the discharge opening, said wiper means having a wall facing the interior of said container, said wall sloping from a region above the center of the rotor upwardly to join the wall of said container at an acute angle.

4,893,738

SELF-ALIGNING POSITIVE DISPLACEMENT DISPENSER

William A. Gelinas, Hadley, Mass., assignor to Loctite Corporation, Newington, Conn.

Filed Oct. 11, 1988, Ser. No. 255,877
Int. Cl.[4] B67D 5/40
U.S. Cl. 222—380 28 Claims



16. A dispenser barrel for dispensing a fluid product comprising:

a housing defining a fluid reservoir and having an inlet for delivery of fluid to said reservoir and an outlet for dispensing the fluid product from said reservoir;

a product piston movable between an inactive position within said reservoir and an active position associated with said outlet to dispense fluid product therethrough;

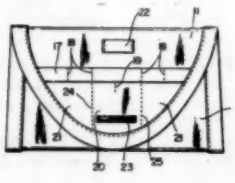
said fluid reservoir being defined by a plurality of subreservoirs, forming walls providing guide surfaces for said product piston to provide self-alignment of said product piston, said plurality of sub-reservoirs being interconnected by means for facilitating flow of said fluid product therebetween.

4,893,739

POCKET FOR GOLF ACCESSORIES

Gail B. Conner, P.O. Box 307, 15 Hunting Ridge Rd., Manakin Sabot, Va. 23103

Continuation-in-part of Ser. No. 625,816, Jun. 28, 1984, abandoned. This application Nov. 15, 1985, Ser. No. 798,300
Int. Cl.[4] A45F 5/00
U.S. Cl. 224—240 4 Claims



1. A pouch suitable for carrying golf balls and golf accessories comprising a main section having a lower portion and a flap portion; said lower portion secured in opposing facing relationship to a first sheet by suitable side edge attachment

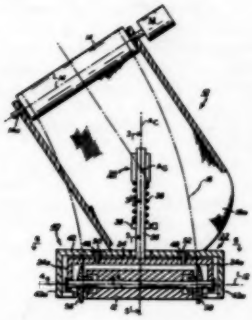
means to form a pouch-like receptacle; said flap portion arranged to fold downwardly upon the outside wall of said pouch-like receptacle and thus forming a closed receptacle; said flap portion containing means to secure in a closed position said flap to said receptacle; said flap portion including a retaining loop for a pencil; and a second sheet shaped to conform to the shape of said flap, and secured in an opposing facing relationship to said flap by suitable attachment means to form slot-like receptacles, said slot-like receptacles containing spaced locations for one or more golf tees, and a divot tool, and also containing a button-hole type slot for receiving one or more ball markers.

4,893,740

WEB TRACKING MECHANISM

Edwin A. Hediger, Fairport; Michael Kenis, and Peter G. Izzo, both of Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 21, 1988, Ser. No. 274,177
Int. Cl.[4] B65H 23/025
U.S. Cl. 226—23 8 Claims



1. Apparatus for controlling the lateral movement of a travelling web, said apparatus comprising;

a steering roller about which a travelling web is at least in part entrained;

first means for supporting said steering roller for rotation about its longitudinal axis, and for mounting said steering roller for angular adjustment about a caster axis perpendicular to such longitudinal axis at the mid-point of said steering roller;

second means for supporting said first means for rotation about a gimbal axis intersecting, and perpendicular to, said caster axis;

sensing means for engaging at least one edge of said web to sense lateral movement of a web supported on said steering roller relative to said steering roller in the direction of said longitudinal axis, said sensing means moving in a corresponding direction to sensed lateral movement of said web; and

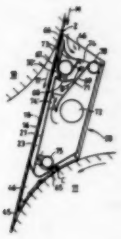
a member associated with said sensing means so as to follow said sensing means, said member including at least one slot defined therein at an angle to the direction of movement thereof, and at least one pin attached to said first means, said pin engaging said slot whereby movement of said slot effects movement of said pin in a direction transverse to the direction of movement of said slot to rotate said first means and thus said steering roller about said caster axis in response to movement of said sensing means to counteract sensed lateral movement of said web.

4,893,741

AIR GUIDE BOX FOR STABILIZING THE PATH OF A PAPER WEB

Helmut Heinzmann, Bobmenkirch, Fed. Rep. of Germany, assignor to J. M. Voith GmbH, Heidenheim, Fed. Rep. of Germany

Filed Nov. 14, 1988, Ser. No. 270,787
Claims priority, application Fed. Rep. of Germany, Nov. 20, 1987, 3739338
Int. Cl.[4] F26B 13/08; B65H 23/24
U.S. Cl. 226—196 14 Claims



1. An air guide box for stabilizing a running web, the air guide box configured to be placed within an entrance gore defined by a web and a guiding means for guiding the web, said air guide box comprising:

first wall for guiding said web, said first wall being positioned along a running path of said web, said first wall and said web defining a gap, said web carrying an air boundary layer in said gap;

second wall facing the guiding means and joining said first wall near the gore;

intermediate wall extending from said first wall to said second wall opposite the gore;

a plurality of side walls connected to said first, second, and intermediate walls, with said first wall, said second wall, said intermediate wall and said side walls defining an interior region of said air guide box;

air suction means located within said interior region for sucking air from said air boundary layer, said first wall having an entrance opening for a first end of said air suction means;

discharge means located at a second end of said air suction means for venting sucked air away from said air boundary layer, said discharge means spaced from said first wall and second wall; and

drive jet nozzle coupled to said air suction means and extending into said air suction means, said nozzle directed toward said discharge means such that air flow from said air boundary layer to said discharge means increases when said drive jet nozzle blows air into said air suction means.

4,893,742

ULTRASONIC LASER SOLDERING

Peter W. Bullock, San Luis Rey, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 21, 1988, Ser. No. 287,763
Int. Cl.[4] B23K 20/10, 26/00
U.S. Cl. 228—110 21 Claims

19. A wire bonder comprising:

a support,

a worktable connected to the support for carrying an object to which a wire is to be bonded,

a bonder frame,

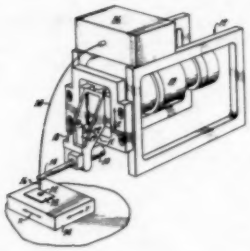
means for mounting the frame to the support for motion in a first direction toward and away from the worktable,

motor means for driving the frame in said direction,

a transducer support,

an ultrasonic transducer carried on said support,

a bonder tool connected to the transducer for movement therewith, said tool comprising a capillary having a solid pressure tip for pressing a lead to be bonded against an object on the worktable, said capillary having a bore extending to the tip, said tip being transparent to laser energy,



means for mounting the transducer support to the bonder frame for motion relative to the bonder frame in said direction,

an optical fiber positioned in the bore and having a fiber end at said pressure tip, and

a laser having a laser beam output connected to said optical fiber.

4,893,743

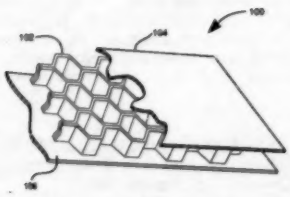
METHOD TO PRODUCE SUPERPLASTICALLY FORMED TITANIUM ALUMINIDE COMPONENTS

Daniel Eylon, Dayton, and Francis H. Froes, Xenia, both of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed May 9, 1989, Ser. No. 349,471

Int. Cl.[4] B23K *20/00, 20/22*

U.S. Cl. 228—181 **15 Claims**



1. A method for producing a titanium aluminide honeycomb-core structural panel which comprises the steps of:

(a) forming a plurality of rapidly solidified titanium aluminide strips into waveform structures;

(b) assembling a plurality of said waveform structures to produce a honeycomb core;

(c) positioning said core between two cover pieces of rapidly solidified titanium aluminide sheetstock; and

(d) diffusion bonding said core to each of said cover pieces

4,893,744

LINING METHOD USING CLAD PIECES AND A CLAD PIECE FOR THE METHOD

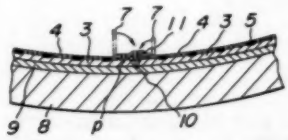
Akira Takayasu, 5-1, Horita-Dori, Mizuho-Ku, Nagoya City, Aichi Pref., Japan

Continuation of Ser. No. 451,829, Dec. 21, 1982, abandoned. This application Jun. 13, 1984, Ser. No. 621,121

Claims priority, application Japan, Dec. 25, 1981, 56-215612

Int. Cl.[4] F16B *5/08*

U.S. Cl. 228—184 **3 Claims**



1. A method of lining chemical apparatus, comprising:

(a) providing clad pieces consisting of a liner layer and a corrosion resistant metal surface layer, said surface layer being superposed on the entire area of said liner layer and said surface layer having raised projecting edges;

(b) arranging at least two of said clad pieces side by side on the inner surface of a chemical apparatus whereby the liner layers of said clad pieces abut forming a seam;

(c) welding together the abutting liner layers of said clad pieces and welding together said clad pieces and said apparatus thereby forming a weld bead;

(d) covering the weld bead with an insert strap of corrosion resistant metal;

(e) superposing the raised projecting edges of the surface layers adjacent the weld bead over said insert strap; and

(f) welding together the superposed projecting edges of said surface layers and said insert strap.

4,893,745

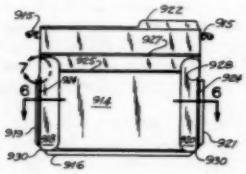
SUSPENDABLE FOLDER

Todd A. Weber, Germantown; Albert Narr, Hubertus; Richard A. Lang; James A. Beck, both of Milwaukee; John J. Weber, Jr., Mequon, and Gary F. Rasmussen, Waurwatosa, all of Wis., assignors to Semco, Inc., Milwaukee, Wis.

Filed Feb. 13, 1989, Ser. No. 309,226

Int. Cl.[4] B65D *27/00*

U.S. Cl. 229—1.5 R **13 Claims**



1. A folder having a front panel and a back panel joined at a bottom seam at the bottom of said panels and side seams at the lateral edges of said panels wherein:

(a) each said side seam begins near said bottom seam and extends for a length not greater than approximately two thirds the total length of the lateral edge of said back panel;

(b) said front panel has at least one transverse score line above the upper end of each said side seam; and

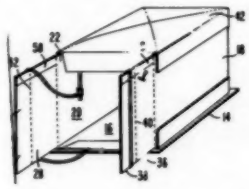
(c) each said side seam comprises means for distributing tearing forces applied to said side seams.

4,893,746

COLLAPSIBLE, REUSABLE SHIPPING CONTAINER

David E. Swanhart, Trenton, and Carl A. Angelini, Spring Lake, both of N.J., assignors to Trent Box Manufacturing Co., Inc., Trenton, N.J.

Filed Feb. 13, 1989, Ser. No. 309,529
Int. Cl.[4] B65D *88/52*
U.S. Cl. 229—23 R 17 Claims



1. An improved collapsible, reusable shipping container being particularly usable for carrying aircraft cargo, which comprises:

(a) a housing means defining a containment chamber therein for holding articles, said housing means comprising:

(1) a base member comprising a floor extending generally horizontally;

(2) a side wall means extending upwardly from said base member to define inwardly facing inner wall means and defining door opening means;

(b) a door means positioned selectively extendable over said door opening means and including:

(1) at least one first door member attached with respect to said side wall means adjacent said door opening means and selectively positionable extending across at least one half thereof, said first door member including:

(a) a first inner door panel extending vertically adjacent said side wall means;

(b) a first outer door panel extending vertically adjacent said first inner door panel spatially disposed from said side wall means;

(2) at least one second door member attached with respect to said side wall means adjacent said door opening means and selectively positionable extending across the other half of said door opening means and at least partially overlapping said first door member, said second door member including;

(a) a second inner door panel extending vertically adjacent said side wall means;

(b) a second outer door panel extending vertically adjacent said first inner door panel spatially disposed from said side wall means and at least partially overlapping said first outer door panel;

(c) a top means extending across said housing means and including:

(1) a base layer;

(2) an outside layer;

(3) a top filler means positioned between said base layer and said outside layer, said top filler means being thinner in the outer area of said top means adjacent said side wall means than in the inner area thereof to provide a convex arcuate profile to said outside layer of said top means;

(d) a first end strap means extending from said top means downwardly to said base member across said first outer door panel of said first door member; and

(e) a second end strap means extending from said top means downwardly to said base member across said second outer door panel of said second door member.

4,893,747

ROTATABLE MAILBOX

Alfred C. Roth, 2388 Yost Blvd., Ann Arbor, Mich. 48104

Filed Jul. 19, 1989, Ser. No. 382,814
Int. Cl.[4] B65D *91/00*
U.S. Cl. 232—39 8 Claims

1. A rotatable mailbox support means comprising:

a base member having a top plate and downwardly extending side members defining a generally U-shaped channel, said base member having mounting means for mounting said base member to a support member;

a support plate rotatably mounted to said base member substantially parallel thereto such that said support plate can rotate with respect to said base member;

a rotational means interconnecting said base member and said support plate permitting rotation of said support plate with respect to said base member;

a control means interconnected to said support plate operably controlling the rotation of said support plate;

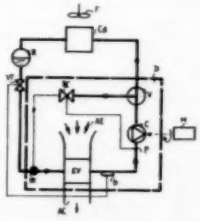
whereby said control means can be operated to release said support plate and permit rotation of said support plate with respect to said base member and to lock said support plate in a fixed position with respect to said base member.

4,893,748

HEATING METHOD AND DEVICE FOR VEHICLES REQUIRING LIMITED POWER

David Balducci, Toulouse, France, assignor to ABG SEMCA, Paris, France

Continuation of Ser. No. 843,223, Mar. 24, 1986, abandoned.
This application Feb. 8, 1988, Ser. No. 154,494
Claims priority, application France, Mar. 26, 1985, 85 03392
Int. Cl.[4] G05D *23/00*
U.S. Cl. 237—2 A 10 Claims



1. Heating device for vehicles with limited power, of the type comprising air conditioning by flowing atmospheric air over a coolant fluid circuit comprising a compressor whose delivery side is connected to a condenser then to a buffer reservoir, a thermostatic valve and an evaporator, further comprising a diverting means for diverting the delivery from the compressor to a depression generating device for heating the atmospheric air flow through the evaporator in order to heat this air, which causes expansion of the coolant fluid in the gaseous phase without loss of energy, before it enters the cabin,

said diverting means and depression generating device being connected between the delivery side of the compressor and the evaporator.

4,893,749

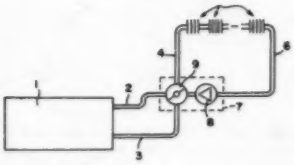
MIXER VALVE FOR HEATING INSTALLATIONS

Karl Schichl, Warngau, Fed. Rep. of Germany

Filed Mar. 17, 1988, Ser. No. 169,745

Int. Cl.[4] F16K *19/00*; F24H *9/20*

U.S. Cl. 237—8 C **7 Claims**



1. In a mixer valve suitable for a heating installation having a hot water inlet, a heater line outlet, a heating return inlet, and a boiler return line outlet communicating with the interior of the mixer valve and a mixer actuator provided with blades disposed within the interior of said mixer valve for directing water flow within the interior of said valve from the hot water inlet to the heater line outlet and heating return line inlet to the boiler return line outlet, said valve integrated within the housing of a circulating pump and controllably coupled to a running wheel drive within the circulation pump for effecting movement of the blades and thereby directing flow of hot water therefrom and return of heating water thereto, the improvement which comprises:

an actuator having blades of a reduced width relative to a space defined therefor within said interior, thereby creating a space between the ends of the blades and the interior such that about 10 percent of any hot water supplied through said hot water inlet will mix with any water returned through said heating return line inlet regardless of a position of the actuator, whereby the heating water returning along the boiler line is reliably heated prior to returning to the heating installation.

4,893,750

FUEL INJECTION NOZZLE

Roy Haworth, Greenford; Michael F. Russell, Chalfont St. Peter, and Adrian R. Tolliday, Kingslynn, all of England, assignors to Lucas Industries Public Limited Company, Birmingham, England

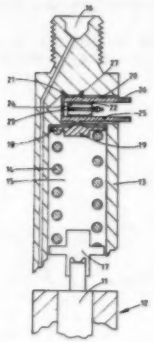
Filed Aug. 5, 1988, Ser. No. 229,180

Claims priority, application United Kingdom, Aug. 15, 1987, 8719372

Int. Cl.[4] G01M *15/00*; F22G *7/14*

U.S. Cl. 239—71 **6 Claims**

1. A fuel injection nozzle for supplying fuel to a compression ignition engine comprising a valve member which is biased to a closed position by means of a spring and which is moved to an open position against the force exerted by the spring by fuel under pressure supplied to an inlet, the nozzle including a body which defines a support surface for the end of the spring remote from the valve member, the nozzle further including a transducer for providing an electrical signal indicative of when the valve member moves to the open position, characterised in that said body defines a blind bore which is open to the exterior of the body, said transducer being located in said bore, and the bore being located in the vicinity of said surface whereby the transducer will provide an electrical signal indicative of changes in the stress in the spring as the valve member is moved to the open position wherein said transducer is contained within a tubular member which is located in the bore, the tubular member being provided with a rib which is a close



fit within the bore to concentrate deformation of said tubular member to maximize the output of said transducer.

4,893,751

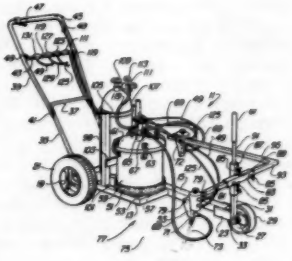
CARBON DIOXIDE POWERED STRIPING MACHINE FOR PAINTING LONG TERM PARKING SURFACES

Carl R. Armstrong, 8386 Homer St., Detroit, Mich. 48209

Filed Aug. 5, 1988, Ser. No. 228,938

Int. Cl.[4] E01C *23/16*

U.S. Cl. 239—150 **7 Claims**



1. A striping machine for painting parking surfaces including long-term parking surfaces comprising:

a frame having a platform;

a laterally arranged arm upon one side of the frame and extending forwardly thereof;

a pair of rear wheels journaled upon the frame;

a front wheel journaled upon one end of said arm;

said wheels being movable over the parking surface to be striped;

an upright support post secured to said arm;

a transverse support tube slidably and adjustably mounted upon said post relative to the parking surface;

a first upright spray head mounted upon said support tube and having a depending normally closed spray outlet directed toward said surface;

a pressurized paint pot storing paint mounted upon said platform and having an outlet conduit connected to said spray head;

a rearwardly and upwardly inclined U-shaped handle connected to said frame;

a tank of carbon dioxide pressurized in the range of 800 to

1500 psi, mounted and anchored upon said platform and having an outlet;

a manifold pipe connected to said tank outlet and having a plurality of outlet connections;

a first conduit interconnecting a first one of said outlet connections and said first spray head for pressurizing said spray head with carbon dioxide;

a second conduit interconnecting a second one of said outlet connections on said manifold and said paint pot to pressurize the interior thereof;

a three-way manual control valve mounted upon said handle;

a third conduit interconnecting a third one of said outlet connections on said manifold with said control valve;

said third conduit extending from said control valve and connected to said spray head for controlling opening of the spray outlet;

with said spray outlet adapted for directing a spray of atomized paint onto said parking surface and forming a line thereon as the frame is moved in a rectilinear path along said surface; and

said spray head being inclined forwardly at an acute angle up to 5 degrees for blowing away loose dirt and dust upon the parking surface as the frame is advanced thereon.

4,893,752

SPRAY NOZZLE DESIGN

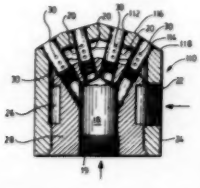
Donald R. Spink, and Edward F. Spink, both of Waterloo, Canada, assignors to Turbotak Inc., Waterloo, Canada

Filed May 6, 1988, Ser. No. 190,828

Claims priority, application United Kingdom, May 6, 1987, 8710685

Int. Cl.[4] B05B 7/04

U.S. Cl. 239—427.3 **5 Claims**



1. A nozzle for the formation of an atomized spray of fine liquid droplets in a continuous gaseous phase or of fine gas bubbles in a continuous liquid phase, which comprises:

first chamber means for communicating with a source of liquid,

second chamber means for communicating with a source of gas,

a plurality of individual cylindrical mixing chamber means communicating with said first and second chamber means for mixing said gas and liquid to form a two-phase mixture of said gas and liquid in each of said individual cylindrical mixing chamber means for ejection from said nozzle, and

a plurality of cylindrical orifice means immediately downstream of, of the same diameter as and communicating with said plurality of individual cylindrical mixing chamber means with each combination of cylindrical orifice means and cylindrical mixing chamber means being arranged at a different angle with respect to each other for ejection of said two-phase mixture from each said individual mixing chamber to form said atomized spray.

4,893,753

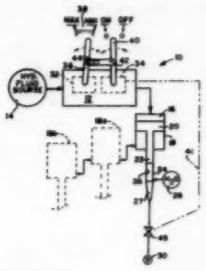
PRESSURE SPIKE SUPPRESSING APPARATUS

Jose P. Munoz, Joplin, Mo., and Raymond M. Jordan, Wixom, Mich., assignors to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Continuation-in-part of Ser. No. 69,914, Jul. 6, 1987, abandoned. This application Feb. 24, 1989, Ser. No. 315,082

Int. Cl.[4] A63H 3/18

U.S. Cl. 239—578 **7 Claims**



1. A waterjet cutting apparatus for limiting pressure spikes caused by hydraulic pressure surges, comprising:

hydraulic pump means for pressurizing hydraulic fluid used to operate the apparatus;

an intensifier driven by the hydraulic pump means;

an on-off nozzle valve coupled to the pump means and to the intensifier;

a first linkage;

a second linkage having a lost motion slot formed therein;

an output control means in the pump for controlling output from the pump and controlling the level of hydraulic fluid pressure admitted to the intensifier;

a first control arm coupled to the output control means and movable between a "MAX" and a "MIN" position;

an on-off nozzle valve actuator means for opening and closing the on-off nozzle valve remotely with the first linkage;

a second control arm coupled to the on-off nozzle valve actuator means and movable between an "ON" and an "OFF" position, the first and second control arms being interconnected by the second linkage, whereby the lost motion slot permits the first control arm to move from the "MAX" to the "MIN" position before the nozzle valve is closed by movement of the second control arm to the "OFF" position, thereby suppressing pressure spikes.

4,893,754

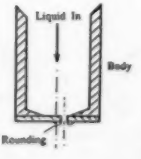
GENERATION OF FLAT LIQUID SHEET AND SPRAYS BY MEANS OF SIMPLE CYLINDRICAL ORIFICES

Francisco Ruiz, 831 S. Euclid Ave., Oak Park, Ill. 60304

Filed Nov. 13, 1987, Ser. No. 119,973

Int. Cl.[4] B05B 1/04

U.S. Cl. 239—601 **1 Claim**



1. An atomizer for generating a flat liquid sheet spray comprising:

a hollow cylindrical container having a central longitudinal axis, said container being devoid of any obstacle to fluid flow and devoid of any additional air supply, said hollow cylindrical container having a substantially flat closed end; and

an orifice disposed in said flat closed end eccentrically offset from the axis of said container, said orifice being cylindrical and having a length substantially equal to its width and having an adjacent outwardly flared portion to provide a gradually opening outlet; and

wherein the eccentricity of the orifice enables generation of a secondary flow of liquid consisting of a pair of counter-rotating vortices so that the flat liquid sheet spray emerges through said orifice, said flat liquid sheet spray being stabilized by the Coanda effect acting on said gradually opening outlet.

4,893,755

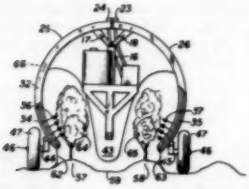
PESTICIDE SPRAYING APPARATUS

J. Phillip Keathley, 25330 S. Ruess Rd., Ripon, Calif. 95366

Filed Oct. 31, 1988, Ser. No. 265,267

Int. Cl.[4] B05B *5/00, 1/20, 15/04*

U.S. Cl. 239—696 **10 Claims**



1. In the apparatus for spraying pesticides or the like comprising:

an arcuately configured canopy open at each end forming a front door and rear door and having a substantially imperforate arcuate inner wall and open along the bottom thereof;

roller means on the exterior of said canopy for rolling the same along a horizontal surface; and

fluid conduit means extending along the upper portion of said inner wall having a plurality of apertures therealong for directing fluid arcuately along said inner arcuate wall, said fluid conduit means also opening along the interior of both said front and rear doors and directing fluid in a direction generally parallel to the plane of said front and rear doors to provide "air doors" thereat

wherein said fluid conduit means includes first fluid directing means for directing fluid in a first direction from said front door to generally the middle of said canopy generally parallel to the curve of said arcuate inner wall and second fluid directing means for directing fluid in a second direction from generally the middle of said canopy to said rear door generally parallel to the curve of said arcuate inner wall opposite that of said first directing means.

4,893,756

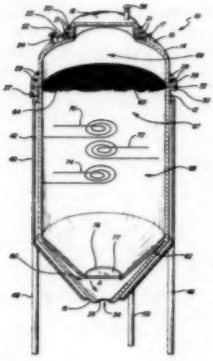
HYDRIDE REACTOR APPARATUS FOR HYDROGEN COMMINUTION OF METAL HYDRIDE HYDROGEN STORAGE MATERIAL

Michael A. Fetcenko, Royal Oak; Thomas Kaatz, Drayton Plains; Steven P. Sumner, and Joseph LaRocca, both of Warren, all of Mich., assignors to Energy Conversion Devices, Inc., Troy, Mich.

Filed Sep. 22, 1988, Ser. No. 247,569

Int. Cl.[4] B02C *19/12*

U.S. Cl. 241—33 **25 Claims**



1. Apparatus for size reduction of metal hydride hydrogen storage alloy material, said apparatus comprising:

(a) a reactor body having a substantially hollow interior volume, said volume divided into at least two regions, a comminuting first region and a collection second region;

(b) at least one reaction gas inlet port into said hollow interior volume and one reaction gas outlet port therefrom;

(c) heating and cooling means for maintaining said interior volume at a preferred temperature;

(d) means for loading said materials into and unloading said materials from the interior of said reactor body; and

(e) a rigid, wide mesh, wire screen adapted to support said hydrogen storage alloy material within said first region of said reactor body so as to provide maximum surface area exposure of said bulk materials, said wire mesh screen further adapted to provide for a uniform, low density powder bed of comminuted hydrogen storage alloy material in said second collection region to insure easy unloading thereof.

4,893,757

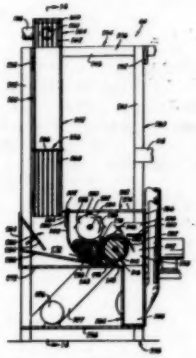
APPARATUS AND METHOD FOR PRODUCING WEIGHED CHARGES OF LOOSELY AGGREGATED FILAMENTARY MATERIAL FROM COMPACTED BALES OF THE MATERIAL

Donald E. Weder; E. H. Weder; Howard M. Ruth, all of Highland; Michael J. King, Staunton, all of Ill.; Franklin J. Craig, Valley Park, Mo.; Larry J. Jones, Highland; Kenton D. Badgley, Alton, both of Ill.; Harry J. Snider, deceased, late of Phoenix, Ariz.; S. Owen Dye, Highland; Clay R. Wiedner, Trenton, both of Ill.; Bill C. Weder, Highland, Ill.; Robert L. Langenberg, San Jose, Calif., and Laura L. Snider (legal representative of said Harry J. Snider, deceased), assignors to Highland Manufacturing and Sales Company, Highland, Ill.

Division of Ser. No. 916,892, Oct. 8, 1986, Pat. No. 4,776,521, which is a division of Ser. No. 640,517, Aug. 13, 1984, Pat. No. 4,646,388. This application Mar. 3, 1988, Ser. No. 163,596

Int. Cl.[4] B02C *19/00*

U.S. Cl. 241—34 14 Claims



1. An apparatus for disintegrating bales of compacted filamentary material, comprising:

a tubular drum having an input port at one end thereof and an output port at the other end thereof;

support means for supporting the drum and rotating the drum about the drum axis, wherein a plurality of spikes are fixed to the drum to extend from the wall of the drum into the interior of the drum, each spike having a hook portion extending generally in the direction of rotation of the drum to terminate in a free end for snagging the filamentary material as the drum rotates; and

a blower positioned adjacent the input port of the drum and facing the drum to direct a stream of air through the drum from the input port thereof to the output port thereof.

4,893,758

BREWING FUNNEL SUPPORT MEANS FOR COFFEE GRINDERS

Henry L. Foley, Chatam; Raymond Bledsoe, Springfield, and James H. Anson, Auburn, all of Ill., assignors to Bunn-O-Matic Corporation, Springfield, Ill.

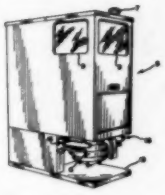
Filed Feb. 27, 1989, Ser. No. 315,802

Int. Cl.[4] A47J *42/40*

U.S. Cl. 241—100 6 Claims

1. In combination with a coffee-grinder having a downwardly discharging ground coffee outlet in a horizontal underside surface of an overhanging portion of said grinder, means for releasably supporting one at a time brewing funnels which are non-uniform in respect to size and shape each having a rim and support flange at its rim in insertable and removable relationship with respect to said grinder comprising:

a pair of bifurcated spring clips each clip having a proximal end and a distal end on each of its branches and including mounting means on its proximal end mounted to said grinder so that said spring clips extend in cantilever manner and brewing funnel support relationship beneath said horizontal underside surface, each said branch being one of a cooperating pair and each said pair of branches being vertically spaced with respect to each adjacent pair, said pairs of branches having different sizes for supporting brewing funnels having sizes falling in different respective size ranges, the brewing funnel engaging portions of said



spring clips being spaced sufficiently below said horizontal underside surface so as to accommodate between said surface and said clips said flange on the rim of a supported brewing funnel, each said branch having an arcuate formation between its distal and proximal ends which formation supportingly engages an inserted brewing funnel and each said pair of clips being sufficiently yieldably spreadable without appreciable permanent distortion to permit insertion of a brewing funnel having a size in its said respective size range.

4,893,759

PAPER SHREDDER WITH CHARGE REMOVING MEANS

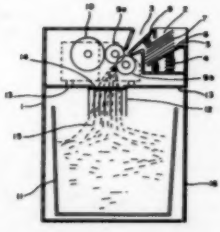
Takehisa Mizobata, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 163,693, Mar. 3, 1988, abandoned. This application May 18, 1989, Ser. No. 355,121

Claims priority, application Japan, Mar. 5, 1987, 62-32777

Int. Cl.[4] B02C *4/28*

U.S. Cl. 241—100 8 Claims



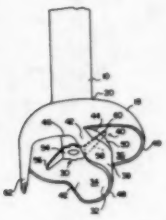
1. In a paper shredder having paper shredding means and a receptacle means below said paper shredding means for receiving and storing pieces shredded by said paper shredding means, the improvement wherein said shredder further comprises charge removing means disposed below said paper shredding means and above said receptacle means for removing static electricity from pieces shredded by said paper shredding means before said shredded pieces contact said receptacle means.

4,893,760

MIXING ARM FOR A DOMESTIC FOOD PROCESSOR

Bernard Boin, and Alain P. C. Bouverie, both of Sté Moulinex-Z.I., Route de St-Jean-des Baisants, 5000 St. Lo, France

Filed Dec. 20, 1988, Ser. No. 286,883
Claims priority, application France, Dec. 31, 1987, 87 18474
Int. Cl.[4] B02C 18/22
U.S. Cl. 241—282.2 9 Claims



1. A mixing arm, especially for chopping foodstuffs immersed in a liquid and comprising;

a tubular guard having an upper part adapted to be mounted on a drive unit and a lower part comprising a bell having a top wall;

a rotatable shaft disposed longitudinally in the tubular guard and having an upper end adapted to be coupled to a rotating drive to be driven at high speed by the drive unit, and a lower end which passes through the top wall of the bell; and

a mixing tool fixed to the lower end of the shaft for rotation therewith and extending transversely to the shaft;

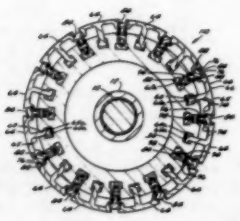
wherein the bell further comprises a partition extending downwards and transversely beneath the top wall of the bell and thus dividing the space beneath the bell into a suction zone in which the mixing tool is located and a compression zone situated between the external face of the partition and the corresponding wall portion of the bell; the upper region of the partition having an oblong transfer opening extending in width in the partition and making the suction zone communicate with the compression zone.

4,893,761

AIR PRESSURE ACTIVATED COLLET

Benjamin A. Gay, Spartanburg, S.C., assignor to Gay & Wagner Research Corporation, Spartanburg, S.C.

Filed Mar. 30, 1988, Ser. No. 175,207
Int. Cl.[4] B65H 54/54, 75/30
U.S. Cl. 242—46.4 6 Claims



1. A collet for use in winding continuous filaments comprising:

(a) a shaft with a central axis;

(b) a hub assembly rotatably mounted on said shaft;

(c) a housing assembly associated with said hub assembly for rotation therewith, said housing assembly including:

(i) a plurality of finger means and wedge means mounted for movement substantially along radial lines emanating from said central axis between respective retracted positions and expanded positions;

(ii) said finger and wedge means each having heads with curved outer surfaces collectively forming a substantially continuous surface when in said respective expanded positions, each of said finger means having a shoulder extending from a terminal end of each side and said head of each wedge means engaging said shoulder of adjacent finger means when said wedge means are moved inwardly to move said finger means to said retracted position, said finger means coupled to said wedge means and moving to said expanded position in response to outward movement of said wedge means; and

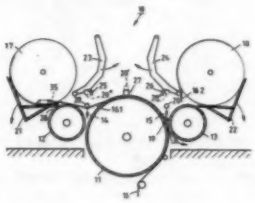
(d) means for moving said wedge means between said respective expanded and retracted positions.

4,893,762

WINDING MACHINE WITH A DEVICE TO SEVER THE WINDING ROLL FROM THE WEB

Friedrich Kuhn, Heidenheim, Fed. Rep. of Germany, assignor to J. M. Voith GmbH, Heidenheim, Fed. Rep. of Germany

Filed Dec. 7, 1988, Ser. No. 280,895
Claims priority, application Fed. Rep. of Germany, May 5, 1988, 8805965[U]
Int. Cl.[4] B65H 19/26
U.S. Cl. 242—56 R 6 Claims



1. A winding machine comprising:

a drum, across which a web to be wound is guided;

a lowering table for taking up and ejecting a winding roll from said machine;

severing means for severing a winding roll from a tensioned web, said severing means being embedded in a plate of said lowering table and located along an edge area of said lowering table near said drum;

actuating means, connected to said severing means, for moving said severing means between a rest position and an operating position;

said severing means adapted to move out of said plate when said actuating means enables said severing means to assume an operating position.

4,893,763

ROLL SUPPORT AND FEED APPARATUS

R. Langdon Wales, Lincoln, and H. W. Crowley, Newton, both of Mass., assignors to Roll Systems, Inc., Burlington, Mass.

Filed Dec. 22, 1987, Ser. No. 136,812
Int. Cl.[4] B65H 19/30
U.S. Cl. 242—58.6 41 Claims

1. Apparatus for supporting and feeding web material from a roll having a support core to a utilization means that draws the web material thereto, said apparatus comprising;

a frame having a base with wheel means for support and

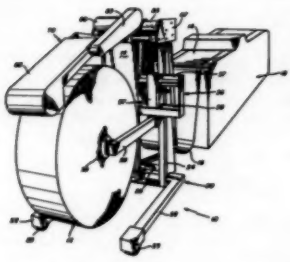
movement of the frame, and upright support means extending from said base at one side thereof,

arm means including a pair of spacedly disposed arms,

chuck means supported at the free ends of said arm for receiving the roll core for support of the web material roll,

means for supporting the arm means from said frame with the arms extending from said upright support means in spaced apart relative parallel position and disposed over the frame base,

drive means including a drive belt for engaging the outer periphery of the roll to drive the roll,



means for supporting the drive means from the frame including a support member for support of the drive belt and pivotally connected at one end thereof to said frame at a position over said arms,

roller means receiving the web material from the roll for support and guiding of the web material between the roll and utilization means,

means for supporting the roller means at a location from the upright support means and that is over the position where the arms extend from the upright support means,

and control means for sensing the draw of the web material into the utilization means to in turn control the rate of the drive of the drive means.

4,893,764

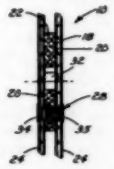
COMPONENT REEL

Timothy J. Justunen, Little Canada, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed Jun. 9, 1988, Ser. No. 204,676

Int. Cl.[4] B65H *75/14*

U.S. Cl. 242—71.9 **10 Claims**



1. A reel adapted to carry a helically wound packaging tape comprising a carrier tape with spaced pockets containing components along its length and at least one cover tape adhered over the pockets to enclose the components, said reel comprising:

a generally cylindrical hub of a resiliently flexible material, having an axis, side surfaces at right angles to said axis, and a peripheral surface;

two circular flanges of a material having greater rigidity than said hub each having an axis, having opposite major side surfaces, being of substantially larger diameter than said hub, and being positioned coaxially along opposite side surfaces of said hub; and

means fastening said flanges together through said hub and axially compressing said hub for providing a predetermined dimension for said reel axially of said hub and flanges, said means comprising a plurality of spaced rivets extending axially through the flanges, each of said rivets including a hollow tubular portion and a cylindrical portion frictionally engaged in said tubular portion a distance sufficient to provide the desired axial dimension for the reel.

4,893,765

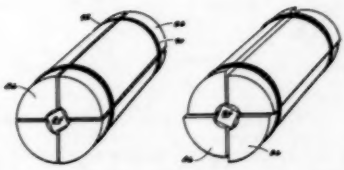
FRICTION CORE HOLDER

Glenn E. Randolph, 5234 Furman Rd., Charlotte, N.C. 28210

Continuation-in-part of Ser. No. 115,484, Nov. 2, 1987. This application Jan. 25, 1989, Ser. No. 301,633

Int. Cl.[4] B65H *75/22*; B23B *31/40*

U.S. Cl. 242—72 R **21 Claims**



1. Apparatus for holding a coiling tube on to a mandrel, said mandrel having longitudinal flat surfaces, said apparatus comprising a plurality of arcuate tube insert segments, each of said segments having an inner arc, an outer arc, and two end sections defining the entire peripheral edge of the segment, each of said inner arcs and said outer arcs having a corresponding center point defining a circle upon which each of said inner and outer arcs lie respectively, wherein the centerpoint of said inner arc and the centerpoint of said outer arc are offset by a predetermined distance of from about 0.015 to about 0.35 inches, whereby when said arcuate segments are mated, the peripheral edges abut to form stops that limit the relative rotation of the mandrel and the apparatus.

4,893,766

TAPE CASSETTE HAVING A FRONT LID AND A BACK LID

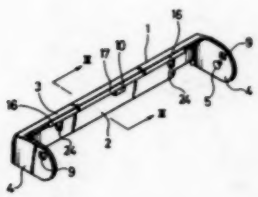
Shuichi Yamashina, Tochigi; Misoru Yahagi, and Yuji Iwahashi, both of Miyagi, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Dec. 5, 1988, Ser. No. 279,539

Claims priority, application Japan, Dec. 28, 1987, 62-200440

Int. Cl.[4] G11B *23/04*

U.S. Cl. 242—198 **4 Claims**



1. A tape cassette in which upon non-use a tape-exposed portion is closed by a front lid and a back lid provided at said

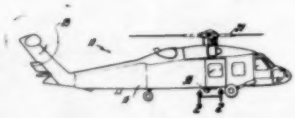
tape-exposed portion of a reel-to-reel type tape cassette, comprising an injection gate provided at a thick portion of a top plate of said front lid at its central portion so that when said front lid is opened, said injection gate portion is untouchably covered by a recess of said back lid, said injection gate being used to mold said front lid.

4,893,767

HELICOPTER CABLE AND EQUIPMENT GUIDE WITH SHOCK ABSORBENCY

John R. Ferraro, Clinton; Philip P. Foerster, Waterbury; Alan Rockall, Oxford, all of Conn., and Steven R. Schwarz, Cranbury, N.J., assignors to United Technologies Corporation, Hartford, Conn.

Filed Jun. 24, 1988, Ser. No. 210,960
Int. Cl.[4] B64C 1/22
U.S. Cl. 244—118.1 10 Claims



1. A guide for disposition within an opening in the fuselage of a helicopter for deploying and retrieving equipment tethered to the interior of said helicopter by a cable, said guide comprising a funnel for receiving said cable and equipment therethrough said funnel being mechanically loaded by the impact of said equipment thereon and by said cable bearing thereagainst, said guide being characterized by:

said funnel comprising a single thickness of a malleable and polishable material; and

means for mounting said funnel for three dimensional movement thereof with respect to said helicopter fuselage, said mounting means comprising:

a first shock absorbing means for accommodating said loading by resiliently opposing vertical movement of said funnel independently of any longitudinal or lateral movement thereof; and

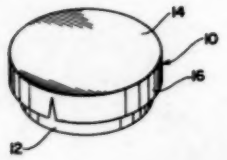
a second shock absorbing means, mounted separately from said first shock absorbing means, for accommodating said loading by resiliently opposing longitudinal and lateral movement of said funnel independently of any vertical movement thereof.

4,893,768

UTENSIL REST AND COMBINATION THEREOF WITH FOOD CONTAINER

Anson L. Hall, 22 Daggett Rd., Attleboro, Mass. 02703

Filed Jun. 20, 1988, Ser. No. 208,978
Int. Cl.[4] A47G 21/14
U.S. Cl. 248—37.3 12 Claims



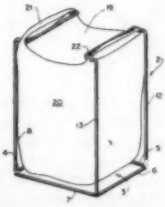
1. A utensil rest comprising a bottom wall portion adapted to be received on a supporting surface and an upstanding peripheral sidewall portion on said bottom wall portion, said sidewall portion terminating in an upper edge and having a pair of spaced upwardly opening peripheral notches therein for receiving and supporting the blade end portion of a table knife so that it is received in both of said notches, said bottom wall portion and said peripheral sidewall portion being dimensioned for supporting the eating end portion of an additional table utensil on said upper edge when said table knife is received in said notches and being further dimensioned such that the handle end portions of said table knife and said additional table utensil are supportable on said supporting surface with said table knife and said additional utensil in substantially parallel relation when the blade end portion of said knife is received in said notches and the eating end portion of said additional utensil is supported on said upper edge.

4,893,769

SUPPORT FRAME FOR PLASTIC BAGS

John L. Rotelli, 706-32nd Ave., San Francisco, Calif. 94121

Continuation of Ser. No. 933,865, Nov. 24, 1986, abandoned.
This application Jan. 4, 1989, Ser. No. 295,010
Int. Cl.[4] A63B 55/04
U.S. Cl. 248—97 2 Claims



1. A support frame with limp plastic bags having strap like hand-grips, comprising:

(a) a unitary base quadrilateral in its configuration and formed from four integral rod-like members lying in a common horizontal plane;

(b) a pair of flexible upright side members extending vertically upwardly from two opposite sides of said unitary base, each side member formed from a pair of perpendicularly extending posts lying in a common plane and having an upper end and a lower end and being integrally attached at the lower end to said base, each side member defining an outer face and an inner face the inner face of one side member being opposed to the inner face of the other side member and parallel therewith when upright;

(c) horizontal inwardly extending hook means having inner and outer ends and shallow U-shaped middle sections, the outer ends being integral with the upper ends of corresponding flexible side members and lying inside the plane in which the corresponding said side members lie said hook means receiving, positioning and retaining in an open position said limp plastic bag with said hand-grips removably draped in said U-shaped middle sections of said hook means, whereby said plastic bag is suspended over said base and between said side members; and

(d) a pair of elongated generally parallel handles lying in a common horizontal plane, each handle being integral with the inner ends of the hook means formed on corresponding side members, and proximate the upper end of each side member, each handle being spaced laterally inwardly from said hook means and toward the other handle from the inner face of its corresponding side member whereby the handles lie inside said hook means and thus inside the hand-grips of a plastic bag draped in said U-shaped middle sections of said hook means, said flexible side members being sufficiently flexible that upon grasping of said handles the upper ends of said flexible side members are displaced toward each other, thereby simultaneously closing

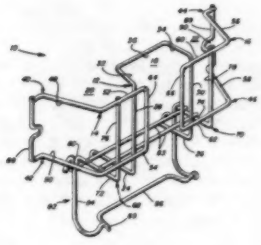
the opening of the limp plastic bag for transportation purposes.

4,893,770

APPLIANCE AND ACCESSORIES ORGANIZER

Thomas R. Bejak, LaGrange Park, and John P. Chap, Lemont, both of Ill., assignors to Selfix, Inc., Chicago, Ill.

Filed Jan. 13, 1989, Ser. No. 297,556
Int. Cl.[4] D06F *75/40*
U.S. Cl. 248—117.1 15 Claims



1. A storage device for household appliances and related items mountable on a support, comprising:

a frame assembly defining a generally upwardly opening appliance storage region and a pair of additional storage regions adjacent thereto;

hanger means depending from said frame assembly and configured to support an article hung therefrom of the type having a portion depending below said hanger means;

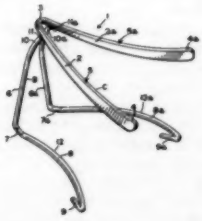
said hanger means comprising a pair of spaced-apart, forward opening hook means, each connected to said frame assembly, and means interconnecting said hook means for maintaining a substantially constant spacing therebetween, said interconnecting means being located to permit access by an article with such a depending portion to both of said hook means through said forward opening portion for support thereon.

4,893,771

COOKING POT LID STAND

Glenn T. Kaneshiro, 99-217 Leomanu Pl., Aiea, Hi. 96701

Filed Dec. 5, 1988, Ser. No. 279,958
Int. Cl.[4] F16M *11/00*
U.S. Cl. 248—176 3 Claims



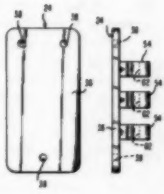
1. A stand comprising of a base and a cradle; the base includes two L-shaped rods; the cradle includes a V-shaped bar; each L-shaped rod includes a vertical and a horizontal, the vertical has a curved portion and the horizontal has a flat section, an arch, and a bend; each of the two L-shaped rods is attached to the underside of a leg of the V-shaped bar, near an end portion of the V-shaped bar, wherein the V-shaped bar includes an end portion and two legs which are arced outward; each leg includes an arc portion and an end portion.

4,893,772

FITTING FOR WIRE STORAGE PRODUCT

William Scott, 505 Bella Capri Dr., Merritt Island, Fla. 32952

Filed Feb. 22, 1988, Ser. No. 158,410
Int. Cl.[4] A47G *29/02*
U.S. Cl. 248—235 4 Claims



1. A fitting for securing a shelf to at least two nearby surfaces, said surfaces being skewed relative to one another, said shelf including at least one support rod, said fitting comprising:

a base portion for connection to one of said surfaces;

a bracket portion having an open channel member adapted to receive an end of said support rod; and,

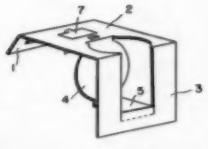
hinge means connecting the base portion to the bracket portion, whereby said base portion of said fitting can be connected to one of said surfaces, whereby the bracket portion can be pivoted about the hinge means relative to the skew angle between said surfaces, so as to permit engagement between said open channel member and said end of said support rod and wherein said channel member comprises at least one upwardly opening channel, whereby an end of said support rod can be positioned in said channel by moving said end of said support rod in a direction substantially parallel to said surface and through said open end into said channel.

4,893,773

ARTICLE HOLDER FOR USE IN A CAR DOOR

Takeo Fujimoto, #A102 Migawa Manshion 85-2, Migawa 2-chome, Mito-shi, Ibaraki-ken, 310, Japan

Filed Oct. 18, 1988, Ser. No. 259,289
Claims priority, application Japan, Mar. 22, 1988, 63-37388[U]
Int. Cl.[4] A47K *1/08*
U.S. Cl. 248—311.2 4 Claims



1. A collapsible article holder for use in a car door comprising:

a strip of sheet material having an insertion portion, a lateral holding portion and a longitudinal holding portion; said insertion portion being adapted for insertion between a window and an inside surface of said car door and having an engagement member provided at a central portion thereof, said engagement member being defined by a

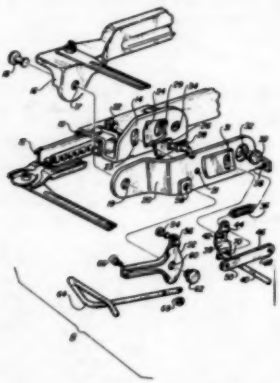
plurality of cut-lines and a fold-line and adapted for engagement with said inside surface of said car door so as to force said insertion portion into contact with said window, said insertion portion being joined to said lateral holding portion through a plurality of fold-lines, said plurality of fold-lines serving as means for adjusting the location of said engagement member inside said car door; said lateral holding portion being adapted to extend in a lateral direction away from said car door and comprises a support member and a truncated disc member, said support member having at least one fold-line provided therein and a tab portion adapted for insertion into a slit provided in said lateral holding portion to fixedly secure said support member in a desired position, said suoport member additionally being adapted for engagement with an upper surface of said car door at a fold-line provided therein and support said lateral holding portion thereon, said truncated disc member being defined by fold-lines provided at a forward and rearward portion thereof and a plurality of cut-lines joining said fold-lines and adapted to form an opening in said lateral holding portion said truncated disc member being joined to said lateral holding portion at said forward portion fold-line when said truncated member is disposed in a vertical position, said lateral holding portion being joined to said longitudinal holding portion by a pair of fold-lines; said longitudinal holding portion having a lateral article support member defined therein, said lateral article support member being defined by said truncated disc rearward portion fold-line, at least one lateral article support member rearward portion fold-line and a pair of cut-lines and forming a lateral support surface when said truncated disc member is disposed in said vertical position.

4,893,774

RECLINER MECHANISM FOR AUTOMOBILE SEATS

Edward A. Corneail, Oxford, and Elaine S. Schultz, Troy, both of Mich., assignors to Semec, Inc., Troy, Mich.

Filed Nov. 7, 1988, Ser. No. 268,128
Int. Cl.[4] A45D *19/00*
U.S. Cl. 248—398 3 Claims



2. A recliner mechanism for an automobile seat assembly mounted on a vehicle floor comprising:

a first plate member constrained from rotating relative to the vehicle floor;

a second plate member selectively lockable with said first plate member;

locking gear teeth formed within a recess in said first plate member;

a pawl member operably connected to said second plate member;

said pawl member sandwiched between said recess in said first plate member and a recess in said second plate member and being actuated into and out of engagement with said locking gear teeth of said first plate member to selectively lock said second plate member at a selected rotated position with respect to said first plate member;

said second plate member being pivotally connected to said first plate member at a first axial position on said second plate member;

a pin being disposed in said second plate member at a second axial position on said second plate member, said pin including a cam member which engages said pawl member;

a slot formed in said first plate member;

said pin sliding in said slot for a limited angular extent thus guiding said second plate member when it pivots with respect to said first plate member;

said pawl member bieng disposed between said first and second axial position on said second plate member;

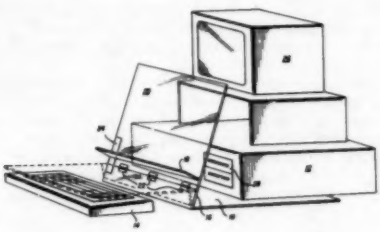
an actuator handle being connected to said second plate member operably connected to said pin and said handle acting to actuate said pawl member through said pin and cam member out of engagement with said gear teeth thus allowing said second plate member and an associated vehicle seat to be rotated through a desired angular extent.

4,893,775

COPY HOLDER STAND

Roy J. Long, 8207 Bowie Dr., Omaha, Nebr. 68114-1525

Filed Dec. 16, 1988, Ser. No. 285,426
Int. Cl.[4] A47F *37/14*
U.S. Cl. 248—442.2 3 Claims



1. A copy holder stand device for use with a computer including a keyboard, said device comprising:

a planar base adapted to be disposed beneath a computer and behind the computer keyboard;

an upwardly extending support member attached to the front edge of said base;

a movable copy holder back against which, in use, materials to be copied rest;

a hinge means for attaching said movable copy holder back to said upwardly extending support member, said hinge means including a generally horizontal pivot axis for providing pivoting of said movable copy holder back between a first position in which said movable copy holder back projects forwardly and horizontally and a second position in which said movable copy holder back extends upwardly and rearwardly, and forms an extension of said upwardly extending support member so that materials to be copied can rest thereon; and

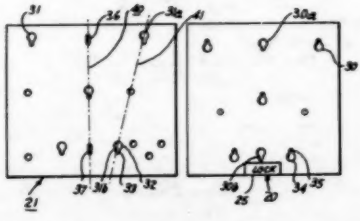
abutment means for limiting the degree of motion of said movable copy holder back between said first position and said second position, said abutment means comprising, a shelf mounted perpendicular to, and intermediate to, said upwardly extending support member, the front of said shelf being of the same height as the top of said upwardly extending support member and adapted to maintain the movable copy holder back in said first, generally horizontal, position, and a brace attached parallel to the rear

surface of, and extending above, the upwardly extending support member, and adapted to maintain the movable copy holder back in said second, generally upright position.

4,893,776
PICTURE HANGING APPARATUS
John F. Floyd, 858 Glendayln Ave., Spartanburg, S.C. 29302
Filed Sep. 20, 1988, Ser. No. 246,790
Int. Cl.[4] G01B *3/02*
U.S. Cl. 248—475.1 **17 Claims**

6. A device for locating a point on a surface for installation of a hanger for an item to be hung on the wall comprising: an elongated support element, said element having means thereon for removably receiving an item to be hung, said element further having guide means located opposite said item hanging means; said guide means defining an arcuate surface located along said element; a plunger associated with said elongated element for movement with respect thereto, a marking means operably associated with said plunger and said guide means, said marking means being movable by said plunger between a non-marking and a marking position; said elongated support element defining an opening therealong, said plunger and said marking means being movable along said opening; and said marking means being flexible such that upon being moved by said plunger against said arcuate surface, said marking means deflects generally transversely with respect to said element and moves outwardly from said element to its marking position.

4,893,777
SECURITY MOUNT
Mark M. Gassaway, 2201 Stern La., Oxnard, Calif. 93035
Division of Ser. No. 947,676, Dec. 30, 1986. This application May 19, 1988, Ser. No. 195,942
Int. Cl.[4] F16M *13/00*
U.S. Cl. 248—551 **8 Claims**



1. A security device comprising:

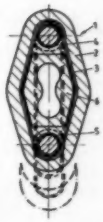
a mounting plate adapted to be attached to a surface, said plate having an axis of relative motion, said plate having a plurality of keyhole slots therethrough, each said slot having an enlarged portion and a narrowed neck portion, said neck portions extending parallel to said axis, and a plurality of said slots being disposed at a different location along said axis, at different lateral distances therefrom;

a coupler respective to each of said last-mentioned slots mounted to structure in a like relationship, each coupler having a shank and a head, the head being proportioned to pass through the enlarged portion but not through the neck portion, the shanks being proportioned to enter the neck portions, the length of the shanks being sufficient to enable the heads to pass through the mounting plate; and releasable lock means to hold the device in a security condition;

said security device including a base plate adapted to lay parallel to said mounting plate, said base plate being adapted to receive an article to be protected and in which said base plate is provided with a plurality of similarly situated and shaped, but oppositely directed keyhole slots, and said couplers including a second such head spaced from said first head to be passed through the respective enlarged portion, the shank being proportioned to fit in both neck portions.

said mounting plate includes a plurality of alignment keyhole slots aligned along said axis, with neck portions oppositely directed from the other keyhole slots in said mounting plates; in which an alignment slot is formed in said base plate respective to each alignment keyhole slot, extending axially; and in which an alignment pin comprises a shank, a head to engage in the alignment keyhole slots in said mounting plate, and a pin adapted to fit and slide in said alignment slots, said slots being disposed and arranged as to limit axial movement of the base plate in an unlocking direction.

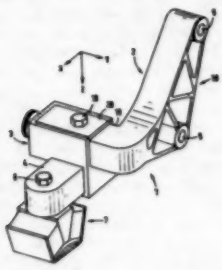
4,893,778
SUSPENSION SYSTEM FOR AN EXHAUST SYSTEM OF A MOTOR VEHICLE
Walter Dribbig, Niestetal, and Kurt Fiedler, Zierenberg, both of Fed. Rep. of Germany, assignors to WEGU Gummi- und Kunststoffwerke, Fed. Rep. of Germany
Filed Nov. 7, 1988, Ser. No. 267,808
Claims priority, application Fed. Rep. of Germany, Nov. 9, 1987, 3737987
Int. Cl.[4] F16M *13/00*
U.S. Cl. 248—610 **6 Claims**



1. A suspension eye for an exhaust system of a motor vehicle comprising a pair of spaced bushes (4,5), a continuous band of elastomer material (2) surrounding said bushes and having a generally rhombus-like initial unloaded shape, and a continuous liner (3) of extensible, resiliently compliant material positioned interiorly of said continuous band and surrounding said bushes and having a generally rhombus-like shape dimensionally compatible with said band when said band is in said initial unloaded shape so that said band and said liner change shape from a rhombus shape to an oval shape as said spaced bushes move further apart in response to an increasing load being applied to said pair of spaced bushes substantially without said liner bearing any of the load until said liner assumes a stretched configuration, whereupon a further load applied to said sus-

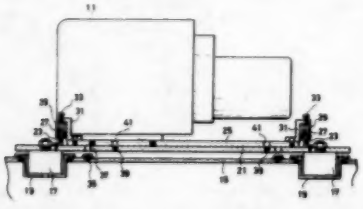
pension eye causes said liner to bear part of the load applied to said bushes,.

4,893,779
MOUNTING DEVICE FOR POWER TRAIN ASSEMBLY OF A MOTOR VEHICLE
Dieter Bergelt, Rüsselsheim, Fed. Rep. of Germany, assignor to General Motors Corporation, Detroit, Mich.
Filed Apr. 3, 1989, Ser. No. 331,711
Claims priority, application Fed. Rep. of Germany, Apr. 2, 1988, 3811259
Int. Cl.[4] F16M *3/00*
U.S. Cl. 248—638 9 Claims



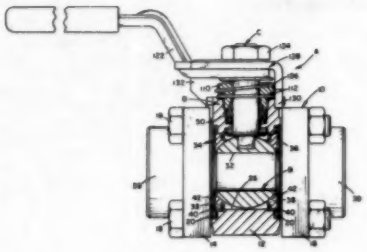
1. Mounting device attaching for a power train assembly of a motor vehicle to a vehicle body by a damping member, characterized in that the mounting device comprises a housing, a bracket slideable and fixable in said housing and connected to the assembly, and a sliding block slideable and fixable in the housing perpendicularly to the direction of sliding of the bracket and connected to the damping member.

4,893,780
GAS BLOWER SUPPORT DEVICE FOR LASER GENERATORS
Ryuji Koseki, La Habra, Calif., assignor to Amada Company, Limited, Japan
Filed Jun. 21, 1988, Ser. No. 210,574
Int. Cl.[4] F16M *13/00*
U.S. Cl. 248—638 2 Claims



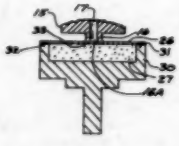
1. A blower support device including means for supporting a blower on a frame of a laser generator comprising:
a plurality of air-mounted isolators disposed on horizontal portions of the frame of the laser generator;
an air-mounted base having a surface supported by the plurality of air-mounted isolators; and
means provided on the air-mounted base for supporting the surface of the air mounted base wherein the blower supporting means comprises a plurality of guide rails provided on the air-mounted base and a plurality of wheels provided on the blower and engaged with the guide rails.

4,893,781
STEM PACKING ASSEMBLY FOR FREQUENT CYCLING VALVE
Terry M. Kalain, Willoughby; Edward M. Yusko Jr., Denmark, and Peter C. Williams, Cleveland Heights, all of Ohio, assignors to Whitey Co., Highland Hts., Ohio
Filed May 19, 1988, Ser. No. 196,368
Int. Cl.[4] F16K *41/04;* F16J *15/20*
U.S. Cl. 251—214 12 Claims



1. A valve comprising:
a body having a chamber communicating with an inlet and outlet;
a valve member disposed in said chamber for selective rotation between open and closed positions;
an actuating stem operatively associated with said valve member extending outwardly from said chamber through a stem passage defined in said body; and,
a packing assembly received in said stem passage and around a portion of said stem, said packing assembly including first, second, third, and fourth members extending respectively outward from said chamber, said first member disposed closest to said chamber, said second member having a greater hardness than said first member, said third member having a greater hardness than said second member, and said fourth member having a greater hardness than said third member, and engaging said body to establish a predetermined compression on said first, second, and third members wherein said second member has a tapering portion engaging a mating, inwardly tapering region of said stem passage for urging said second member toward said stem and limiting extrusion of said first member therepast, said third and fourth members include first and second slippage surfaces for providing axial slipping engagement therebetween.

4,893,782
METALLIC SEAT FOR FLUID VALVE
Charles G. Franke, Hilltown, Pa., assignor to Emerson Electric Co., St. Louis, Mo.
Filed Mar. 28, 1988, Ser. No. 173,991
Int. Cl.[4] F16K *1/36*
U.S. Cl. 251—356 6 Claims



1. A valve head for controlling flow relative to a valve body

that has a sealing seat surface for controlling flow through a passageway in the valve body, said valve head comprising a valve head housing, a chamber formed in said valve head housing and having an open side surrounded by a peripheral rim that has an outer edge defining a plane, in substantially planar metal disc overlying said open side and resting on the edge of the peripheral rim, and being sealed with respect to said peripheral rim of said valve head housing to enclose said chamber, and a filling of flowable, substantially non-compressible fluid in said chamber selected for providing support for the disc across the side of the means facing said chamber and relative to the valve head housing.

4,893,783

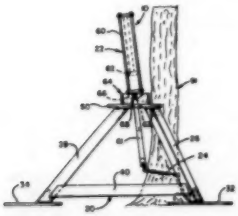
TREE AND TREE STUMP REMOVAL APPARATUS AND ASSOCIATED METHOD

Robert G. Diener, 1287 Woodruff Pl., Morgantown, W. Va. 26505, and Ian R. Domigan, Lincoln Agricultural College, New Zealand

Continuation of Ser. No. 66,131, Jun. 24, 1987, abandoned. This application Jan. 26, 1989, Ser. No. 303,037

Int. Cl.[4] B66F *1/08*

U.S. Cl. 254—1 **17 Claims**



1. A tree removal apparatus comprising

a frame having its upper portion spaced from a lower portion,

pivotally mounted hydraulic means secured near said upper portion of said frame including a cylinder, a piston reciprocable within said cylinder, strut means operatively associated with said piston and extending axially therefrom, and pivot means for permitting rotation of said cylinder relative to said frame, and

engagement means secured to said strut means to engage a tree, whereby said pivotally mounted hydraulic means will apply a generally upward force to said tree through the engagement means in order to effectively lift said tree along with its associated roots out of the ground.

4,893,784

METHOD AND APPARATUS FOR JACKING BASEMENT WALLS

Robert S. Abraham, Wild Rose, and Dennis L. Kochler, Neenah, both of Wis., assignors to Robert S. Abraham, Wild Rose, Wis.

Continuation of Ser. No. 57,353, Jun. 2, 1987, Pat. No. 4,763,878, which is a continuation-in-part of Ser. No. 835,519, Mar. 3, 1986, Pat. No. 4,669,704. This application Jul. 25, 1988, Ser. No. 223,917

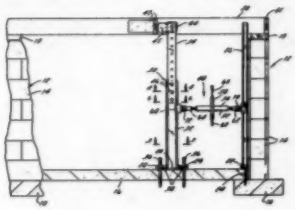
Int. Cl.[4] B66F *11/00*

U.S. Cl. 254—100 **6 Claims**

1. Apparatus for jacking a vertical wall having moved inward out of its proper position, said wall resting on a lower surface, said apparatus comprising:

a vertical wall brace having a top end and a bottom end, said bottom end being provided with means for attaching to said lower surface adjacent to said wall to be jacked in such a manner as to permit movement of the brace relative to said attaching means;

an upstanding beam including means for being removably attached to at least said lower surface a suitable distance from said wall to be jacked;



a jacking assembly having two ends, one end slidably attached to said wall brace, the opposite end slidably attached to said upstanding beam, for moving said brace and in turn said wall outward back to its proper position; and

means for anchoring the top end of said brace such that when said wall has reached its proper position, said wall is thereby prevented from moving out of position again.

4,893,785

LIFTING DEVICE

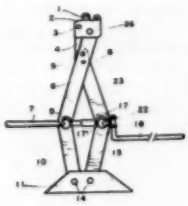
Robert E. Rose, Rua Dr. Procópio Ribeiro dos Santos, 187, City of Sao Paulo, State of Sao Paulo, Brazil

Filed Dec. 3, 1987, Ser. No. 128,203

Claims priority, application Brazil, Jan. 12, 1987, 6700026

Int. Cl.[4] B66F *3/00*

U.S. Cl. 254—126 **10 Claims**



1. A compact, pantographic-type jack, comprising

a lower pair of arms supported on a base, an upper pair of arms coupled with said lower pair, with a respective arm of said upper pair being coupled to a respective arm of said lower pair,

one of said arms of said upper pair being longer than the other of said upper pair of arms,

a movable support provided at a free end of said longer arm, and

a support linkage articulated to said shorter arm and coupled to said movable support,

wherein said arms of said upper pair are additionally coupled to one another, and said arms of said lower pair remain uncoupled from one another, and

said longer arm is coupled to said shorter arm at a point on said shorter arm between coupling of said articulated linkage and coupling of said respective lower arm to said shorter arm,

whereby said movable support remains level while said jack is being raised or lowered.

4,893,786

CABLE CONDUIT APPARATUS

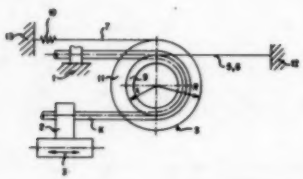
Ernst Huber, Wettingen, Switzerland, assignor to GRETAG Aktiengesellschaft, Regensdorf, Switzerland

Continuation of Ser. No. 89,125, Aug. 25, 1987, abandoned. This application Nov. 30, 1988, Ser. No. 279,299

Claims priority, application Switzerland, Aug. 29, 1986, 3482/86

Int. Cl.[4] B66D *1/50*

U.S. Cl. 254—414 10 Claims



1. A conduit apparatus for a cable connecting a stationary first member with a second member that is displaceable relative to said first member along a linear path, comprising:

a cable having a first end connected to said stationary first member and a second end connected to said displaceable second member;

cable drum means for at least partially looping the cable thereover, said cable drum means having first and second diameters; and

first and second stationarily mounted supporting

cord layouts from which said cable drum means is rotatably suspended and which extend essentially parallel to the linear path and are looped around said cable drum means in directions opposing one another, said first and second cord layouts supporting said cable drum means between opposed stationary parts.

4,893,787

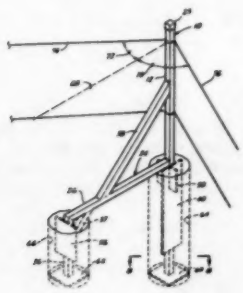
FENCE CORNER POST

Terry D. Watson, P.O. Box 374, Cheyenne, Okla. 73628

Filed Feb. 24, 1988, Ser. No. 159,719

Int. Cl.[4] E04H *17/02*

U.S. Cl. 256—35 5 Claims



1. A fence corner post assembly comprising:

a steel main post fabricated of square steel tubing and having an upper end, medial portions and a lower end;

a steel brace member welded to the medial portions of the main post, the brace member fabricated of square steel tubing and having a body portion extending substantially perpendicularly from one side of the main post and a downturned leg portion extending substantially parallel to the main post;

a steel strut welded to upper portions of the main post and the body portion and extending therebetween, whereby the main post, brace member and strut are formed into a rigid, generally planar structure;

a steel first stabilization plate welded to the main post and the body portion of the brace member, the first stabilization plate projecting laterally from opposite sides of the main post in the plane formed by the main post, brace member and strut to extend downwardly from the body portion of the brace member a selected distance along the main post toward the lower end thereof;

a steel additional stabilization plate welded to the leg portion of the brace member to project laterally to opposite sides thereof in a substantially perpendicular relation to the plane formed by the main post, the brace member and the strut and to extend along the leg portion a distance from the body portion toward the extensive end of the leg portion;

a steel first anchor plate welded to the lower end of the main post; and

a steel second anchor plate welded to the extensive end of the leg portion of the brace member.

4,893,788

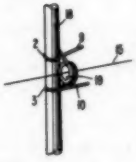
FENCE CLIP

Barry J. Chave, Auckland, New Zealand, assignor to Techlink Development Limited, Auckland, New Zealand

Filed Oct. 24, 1988, Ser. No. 263,413

Int. Cl.[4] B21F *27/08*

U.S. Cl. 256—47 6 Claims



1. A fence clip of elongated wire-like material, said fence clip comprising:

a pair of spaced apart loops resiliently biased into planes inclined one to another;

manually actuable lever means attached to said pair of loops for resiliently moving said pair of loops towards parallel planes relative to one another against the resilient bias thereof and for simultaneously increasing the apparent diameter of each one of said pair of loops when viewed along an axis passing through each one of said pair of loops, and each one of said pair of loops being sufficiently large for causing the apparent diameter of each one of said pair of loops to encircle a fence post or standard for being placed thereon when said lever means biases said loops towards parallel planes, and each one of said pair of loops gripping an encircled post or standard when said lever means no longer biases said pair of loops towards parallel planes and said pair of loops returns to planes inclined one to another; and

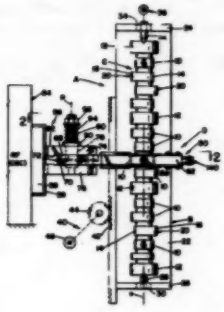
holding means attached to said pair of loops for holding a wire, tape, or the like.

4,893,789

METHOD AND APPARATUS FOR HARDENING CAM LOBES ON A CAMSHAFT

Donald E. Novorsky, Pleasant Ridge, Mich., assignor to Tocco, Inc., Boaz, Ala.

Division of Ser. No. 944,510, Dec. 22, 1986, Pat. No. 4,759,808.
This application May 19, 1988, Ser. No. 195,953
Int. Cl.[4] C21D 9/30
U.S. Cl. 266—129 19 Claims



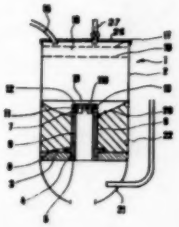
1. Apparatus for inductively heating and hardening like finish ground cam lobes axially spaced on a camshaft closely apart a distance less than their axial thickness, said apparatus comprising: an inductor mounted in a fixed position and having a single conductor loop with a cam lobe encircling inner surface contoured to correspond to substantially the entire surface profile of said cam lobes and adapted to receive the cam lobes individually in inductive heating position therein in the same rotatively oriented position about the axis of said camshaft as the inner surface contour of the inductor, with a uniform minimal inductive coupling gap therebetween and completely therearound of less than around 0.1 inch, means mounting and actuating said camshaft for axial and rotative index movement relative to said inductor to position each of the cam lobes of said camshaft individually in said inductor in the said same rotatively oriented position therein, high frequency power supply means for selectively energizing said inductor by input leads at a frequency greater than 200 KHz and with a high intensity power density of at least 25 KW/inch^2 at the surface profile of the cam lobe positioned in said inductor, and means for energizing said power supply for less than 1.0 second whereby to substantially instantaneously inductively heat the said positioned cam lobe uniformly therearound to a predetermined elevated heat treating temperature preparatory to subsequent quench hardening without causing unacceptable heat distortion of the finish ground surface profile of the heated cam lobe and without causing stray flux heating and drawback tempering of the previously hardened adjacent cam lobe, said conductor loop having two elongated segments joined at one end by a pressure electrical connector and connected to respective said input leads at the other ends, and means for allowing said inductor to selectively convert between a heating condition, with said segments electrically connected, and a clearance condition with said segments laterally separated and moved laterally outwardly from said camshaft a distance allowing both the said axial and rotative index movement of said camshaft with respect to said inductor.

4,893,790

APPARATUS FOR PRODUCING METAL ZIRCONIUM BY THE REDUCTION OF ZIRCONIUM TETRACHLORIDE

Jean Boutin, St Martin D'Heres; Pierre Brun, Grenoble, and Airy-Pierre Lamaze, Jarrie, all of France, assignors to Compagnie Europeenne du Zirconium Cezus, Courbevoie, France

Division of Ser. No. 94,425, Sep. 9, 1987, Pat. No. 4,782,331.
This application Mar. 15, 1988, Ser. No. 168,151
Claims priority, application France, Sep. 19, 1986, 86 13306
Int. Cl.[4] C22B 34/14
U.S. Cl. 266—168 14 Claims



14. Apparatus for the production of metal zirconium by reduction of Zr tetrachloride with molten magnesium, resulting in a mass of Zr, Mg and supernatant, molten $MgCl_2$, comprising:

a reactor;

a hearth plate for collecting said mass thereon disposed laterally across the interior of said reactor, said hearth plate having an orifice therein, and defining a portion of said reactor above said hearth plate, and a portion of said reactor below said hearth plate;

means for supplying gaseous Zr tetrachloride to the interior of said reactor above said hearth plate;

means for heating said reactor;

means for drawing a vacuum in said reactor;

chimney means having one end removably fitted into the orifice in the hearth plate and thereby sealingly fixed to the orifice in said hearth plate, and rising therefrom above said hearth plate to a top end at a level corresponding to the expected height of the supernatant $MgCl_2$ at the conclusion of the reduction, said chimney means being at least partially open to its interior at said top end, thereby providing communication and a flow path for molten $MgCl_2$ from the interior of said reactor at said top end through said chimney means and said orifice and to the interior of said reactor below said hearth plate;

a cap connected to the open top end of said chimney means by an apertured connecting portion, said cap and connecting portion comprising a lifting portion;

means for removing molten $MgCl_2$ from the reactor disposed in the interior of said reactor below said hearth plate.

4,893,791

AUTOMATIC LANCE CHANGEOVER DEVICE

Hubert Stomp, Howald; Carlo Heintz; Andre Kremer, both of Luxembourg; Jean Monai, Petange, all of Luxembourg; Daniel Fries, Arlon, Belgium, and Serge Devillet, Bissen, Luxembourg, assignors to Paul Wurth S.A., Luxembourg, Luxembourg

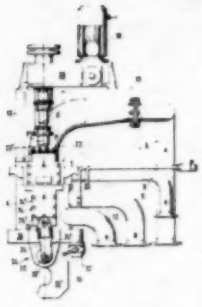
Filed Sep. 7, 1988, Ser. No. 241,530
Claims priority, application Luxembourg, Sep. 7, 1987, 86985
Int. Cl.[4] C21C 5/46
U.S. Cl. 266—226 14 Claims

1. Automatic lance changeover device for coupling lances to a vertically displaceable lance carriage during metal refining, the substances required for the metal refining being delivered

to a lance carriage coupling head on the lance carriage and being transferred into the lance, comprising:

at least one pair of lance receiving hooks attached to said lance carriage coupling head, one each of said hooks being positioned on opposed sides of said lance carriage coupling head;

vertical displacement means for the synchronous vertical



displacement of said hooks relative to said lance carriage and to said coupling head;

pivoting means for pivoting said hooks about a horizontal axis of rotation of said hooks while said horizontal axis is vertically displaced by said vertical displacement means; and

load detection means for detecting the load acting on said hooks.

4,893,792

COLD TRAP

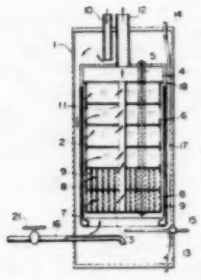
Kiyomitsu Nemoto; Norikatsu Yokota, both of Hitachi; Yoshihiko Sato, Ibaraki; Shigehiro Shimoyashiki, Hitachi; Kenji Mokuya, Hitachi, and Hiroshi Haino, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 9, 1988, Ser. No. 268,759

Claims priority, application Japan, Nov. 16, 1987, 62-287330

Int. Cl.[4] C21B *3/04*

U.S. Cl. 266—227 **16 Claims**



1. A cold trap wherein at least one mesh screen and at least one mesh having higher strength and wider mesh holes than said at least one mesh screen are contained within a shell through which liquid passes, each of said meshes is disposed so that the surfaces of the respective meshes intersect the flow of said liquid, and said at least one spacer mesh extends at a location of an inflow surface through which said liquid is delivered to an assembly of said at least one spacer mesh and said at least one mesh screen, at a location of an outflow surface through which said liquid is discharged out of said assembly and in at least one position between adjacent parts of said at least one mesh screen.

4,893,793

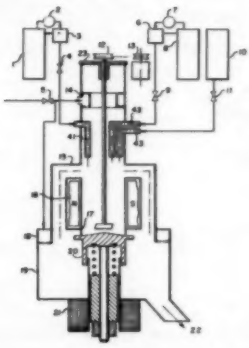
APPARATUS FOR THE MANUFACTURE OF A THERMOSTABLE AMORPHOUS FERROMAGNETIC POWDER

Dimiter T. Butchkov; Yovka D. Dragieva; Zvetan K. Nikolov; Georgi G. Georgiev; Mina S. Slavtcheva-Stafkova, and Ivanka S. Grozdanova, all of Sofia, Bulgaria, assignors to VMEI LENIN, Sofia, Bulgaria

Division of Ser. No. 913,786, Sep. 30, 1986, abandoned. This application Mar. 23, 1988, Ser. No. 171,991

Int. Cl.[4] C21C *7/00*

U.S. Cl. 266—233 **8 Claims**



6. An apparatus for manufacture of thermostable amorphous ferromagnetic powder comprising:

a vertical reactor with stirrer and electromagnet for generating a magnetic field, said reactor further comprising:

a reaction vessel with a plurality of inlet tubes, said tubes each being connected by means of valves to a source of reactor solutions, said reaction vessel being provided with overflow tubes connected to a surrounding collecting vessel and said reaction vessel having an openable bottom opening into said collecting vessel,

said apparatus being provided with a plurality of shower washing means for terminating a reaction in said apparatus;

one of said washing means being located above said overflow tubes and another of said washing means being provided below said overflow tubes.

4,893,794

DEVICE FOR MOUNTING A GRIPPER TO A PIERCING MACHINE

Pierre Mailliet, Howald, and Jean Metz, Luxembourg, both of Luxembourg, assignors to Paul Wurth S.A., Luxembourg

Filed Sep. 22, 1988, Ser. No. 250,688

Claims priority, application Luxembourg, Oct. 6, 1987, 87010

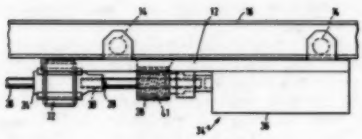
Int. Cl.[4] C21B *7/12*

U.S. Cl. 266—271 **5 Claims**

1. Device for mounting a gripper to a working tool, the working tool being mounted on a sliding carriage of a piercing machine, the gripper being adapted for coupling a rod to the working tool for piercing the taphole of a shaft furnace, the gripper having a female thread for threading onto a threaded endpiece of the working tool, including:

support cage means fixed to the sliding carriage, said sup-

porting cage means including means for maintaining vertical and lateral support of the gripper and means for allowing the gripper to slide longitudinally relative to the support cage.



4,893,795

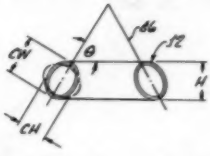
RADIALLY LOADED CANTED COILED SPRING WITH TURN ANGLE

Peter J. Balsells, P.O. Box 15092, Santa Ana, Calif. 92705, assignor to Peter J. Balsells and Joan C. Balsells, both of Santa Ana, Calif.

Filed Aug. 15, 1988, Ser. No. 232,430

Int. Cl.[4] F16F *1/06*

U.S. Cl. 267—1.5 **16 Claims**



1. A radially resilient canted coiled spring comprising:

a plurality of coil means, interconnected and canted along a centerline thereof, for causing the coiled spring to exert a generally constant force over a preselected range of deflection of the coiled spring in response to radial loading;

back angle means for defining the disposition of a trailing portion of each coil with respect to a line normal to the centerline;

front angle means for defining the disposition of a leading portion of each coil with respect to the normal line, said front angle means being greater than said back angle means; and

means, orienting said plurality of coil means at a turn angle, for controlling the magnitude of the generally constant force within the preselected range of deflection, said turn angle being greater than zero degrees and less than 90 degrees.

4,893,796

PENDULUM VIBRATION ISOLATOR AND DAMPER

Derek F. Hickman, Chessington, and Raymond H. Boshier, Basingstoke, both of England, assignors to Racal Marine Electronics Limited, United Kingdom

PCT No. PCT/GB88/00033, § 371 Date Oct. 11, 1988, § 102(e) Date Oct. 11, 1988, PCT Pub. No. WO88/05507, PCT Pub. Date Jul. 28, 1988

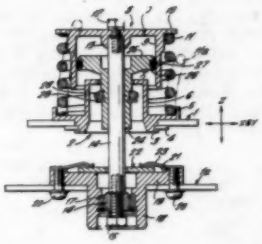
PCT Filed Jan. 19, 1988, Ser. No. 250,626

Claims priority, application United Kingdom, Jan. 27, 1987, 8701772

Int. Cl.[4] F16M *1/00, 13/00*; F16F *1/00*

U.S. Cl. 261—136 **9 Claims**

1. A vibration isolator and damper comprising a base (3), a pendulum assembly (8,14), a spring support (11) which supports one end of the pendulum assembly with respect to the base and provides resilience lengthwise of the assembly while allowing swinging movement of the pendulum assembly, a pivoted coupling means (16,17) provided at the other end of the pendulum assembly, first and second damping means (9,25,22) and first and second means for coupling (7, 28, 19, 23) the first and second damping means to the pendulum assembly



for damping lengthwise and swinging movement of the pendulum assembly only after a predetermined amount of respective lengthwise and swinging movement of the pendulum assembly while supported by the spring support.

4,893,797

HYDROELASTIC SUPPORT, IN PARTICULAR FOR THE SUSPENSION OF A MOTOR IN A VEHICLE

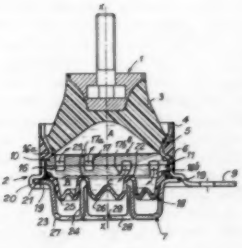
Marcel Le Fol, Chateaugiron, and Pascal Robic, Guignen, both of France, assignors to Automobiles Peugeot, Paris and Automobiles Citroen, Neuilly, both of, France

Filed Jul. 6, 1988, Ser. No. 215,516

Claims priority, application France, Jul. 7, 1987, 87 09650

Int. Cl.[4] F16F *13/00*

U.S. Cl. 267—140.1 **8 Claims**



1. A hydroelastic support comprising armatures, a block of elastomeric material interconnecting the armatures, a work chamber partly defined by the block of elastomeric material, and means defining a first expansion chamber, a first duct for connecting the expansion chamber to the work chamber, means defining at least one second expansion chamber, means for isolating the second expansion chamber from the first expansion chamber, the first and second expansion chambers being disposed concentrically, a second cut for connecting the second expansion chamber to the work chamber, the first duct and the second cut having characteristics of length and/or section, said characteristics of the second cut being different from said characteristics of the first duct, said support further comprising liquid filling said chambers, the expansion chambers being disposed on the same side of the work chamber, a rigid partition carried by one of the armatures separating the two expansion chambers, said ducts being at least partly defined in said partition, a single diaphragm defining the expansion chambers with said partition, means for applying an intermediate portion of said diaphragm against the partition in a

sealed manner, and said means for applying said intermediate portion of said diaphragm against the partition includes a cover which is connected to said armature which carries the partition.

4,893,798

FLUID-FILLED ELASTIC BUSHING HAVING MEANS FOR LIMITING ELASTIC DEFORMATION OF AXIAL END PORTIONS OF ELASTIC MEMBER DEFINING PRESSURE-RECEIVING CHAMBER

Masayuki Hibi, Komaki; Nobuo Matsumoto, Nagoya, and Yoshiki Funahashi, Iwakura, all of Japan, assignors to Tokai Rubber Industries, Ltd., Aichi, Japan

Filed Dec. 5, 1988, Ser. No. 279,794

Claims priority, application Japan, Dec. 7, 1987, 62-309292

Int. Cl.[4] F16M *5/00, 13/00*

U.S. Cl. 267—140.1 7 Claims

1. A fluid-filled elastic bushing for damping or isolating a vibrational load, comprising:

an inner sleeve and an outer sleeve disposed radially outwardly of said inner sleeve;

a generally annular elastic member formed between and elastically connecting said inner and outer sleeves, so as to provide an assembly having a plurality of fluid chambers which are spaced apart from each other in a circumferential direction of said sleeves and are filled with a non-compressible fluid, said assembly further having orifice means for fluid communication between said fluid chambers;

a wing member disposed in at least one of said plurality of fluid chambers to which the vibrational load is applied, said wing member being supported by one of said inner and outer sleeves and said elastic member, said wing member cooperating with said assembly to define a restricted portion within each of said at least one fluid chamber; and

a restrictor member fixedly disposed so as to extend in a portion of said elastic member in an axial direction of the elastic bushing, for limiting axial elastic deformation of said elastic member at axial end portions thereof which define opposite ends of said each fluid chamber as viewed in said axial direction of the elastic bushing, and minimizing changes to the restricted portion.

4,893,799

VIBRATION ISOLATION APPARATUS

Etienne de Fontenay, Decize, France, assignor to Kleber Industrie, Versailles Cedex, France

Filed Jan. 22, 1988, Ser. No. 147,296

Claims priority, application France, Jan. 23, 1987, 87 00762

Int. Cl.[4] F16F *9/00*

U.S. Cl. 267—140.1 13 Claims

1. A vibration isolation apparatus, said apparatus comprising:

an external tube member;

a first intermediate tube member positioned substantially concentric with and within said external tube member;

said external tube member and said first intermediate tube member forming a first annular space therebetween;

at least one additional tube member positioned substantially concentric with and within said first intermediate tube member;

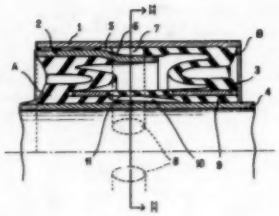
said first intermediate tube member and said at least one additional tube member forming a second annular space therebetween;

said external tube member, said first intermediate tube member and said at least one additional tube member each having a first end and a second end;

first flexible lateral end wall means for flexibly positioning and interconnecting said first ends of said first intermediate tube member and said at least one additional tube member;

second flexible lateral end wall means for flexibly positioning and interconnecting said second ends of said first intermediate tube member and said at least one additional tube member;

a first substantially nonpermeable partition positioned within said first annular space and extending between said first and second flexible lateral end wall means;



substantially nonpermeable divider means for dividing said second annular space into first and second chambers;

first orifice means for establishing communication between said first annular space and said first chamber;

second orifice means for establishing communication between said first annular space and said second chamber; and

a damping fluid contained within said first annular space and said first and second chambers;

wherein said at least one additional tube member is provided with flexible peripheral means for expanding said second annular space in response to pressure transmitted by said damping fluid; and

wherein said flexible peripheral means comprises at least one window opening provided in side at least one additional tube member, and a flexible membrane extending over said at least one window opening.

4,893,800

ELECTRONICALLY CONTROLLED VIBRATION DAMPER FOR MOUNTING AUTOMOTIVE INTERNAL COMBUSTION ENGINES AND THE LIKE

Toshiyuki Tabata, Sagamihara, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed Aug. 11, 1988, Ser. No. 231,014

Claims priority, application Fed. Rep. of Germany, Aug. 11, 1987, 62-201191

Int. Cl.[4] F16M *5/00, 13/00*; F16F *15/03*

U.S. Cl. 267—140.1 8 Claims

1. A system comprising:

a first vibratable body;

a second vibratable body;

first and second suspensions, said first suspensions suspending said first vibratable body on said second vibratable body, and said second suspension suspending said second vibratable body on a surface, said first suspension including a mounting device for damping vibration which is applied to said second vibratable body from said first vibratable body by way of said first suspension and from

said surface by way of said second suspension, said mounting device comprising:

a housing, said housing containing a a fluid exhibiting electrorheopectic properties;

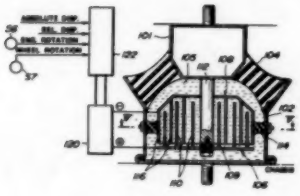
first and second electrode structures suspended in said housing in a manner to be immersed in said electrorheopectic fluid, said first electrode structure being operatively connected with said first vibratable body so as to be movable therewith, said second electrode structure being connected to said housing through a resilient member, said electrorheopectic fluid undergoing a change in viscosity when a voltage is applied across said first and second electrode structures;

a spring, said spring being operatively connected to both said first vibratable body and said first electrode structure, said spring being subject to compression when the relative displacement between said first and second vibratable bodies decreases;

sensor means for sensing:

absolute displacement of said mount;

relative displacement of said mount;



a first predetermined parameter which varies with the vibration produced by said first vibratable body; and

a second predetermined parameter which varies with the frequency of the vibration applied to said second vibratable body by way of said second suspension;

a control circuit operatively interposed between said sensor means and said first and second electrode structures, said control circuit being responsive to inputs from said sensor means for selectively applying the voltage to said first and second electrode structures; and

a vibration generator, said vibration generator being arranged in a manner to selectively produce preselected vibrations; wherein said spring takes the form of an elastomeric member which is operatively connected between said housing and a connection member, said connection member being detachably connected to said first vibratable body, said elastomeric member and said connection member closing said housing in a manner to define a closed chamber therein,

said vibration generator is disposed in said connection member and operative to selectively produce predetermined vibrations.

4,893,801

CLAMP

Robert W. Flinn, 2806 Balmoral Ct., Fort Collins, Colo. 80525

Filed Dec. 16, 1988, Ser. No. 285,210

Int. Cl.[4] B25B *5/02*

U.S. Cl. 269—6 **15 Claims**

1. A clamp operable with one hand, said clamp comprising:

(a) elongated support means having first and second ends; said support means comprising two spaced-apart, parallel, horizontal support arms;

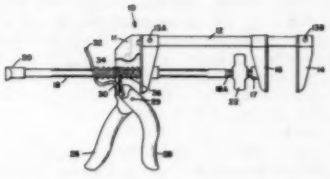
(b) a base member secured to said first end of said support means;

(c) handle means carried by said base member, said handle means including a movable lever arm;

(d) a stationary jaw member secured to said second end of said support means and extending downwardly therefrom;

(e) a movable jaw member supported by said support means and being movable therealong; said movable jaw member extending downwardly from said support means and being pivotable with respect thereto;

(f) an elongated pressure arm having first and second ends, said second end being attached to said movable jaw member; wherein said pressure arm extends through said base member; and wherein said pressure arm is disposed below and parallel to said horizontal support arms;



(g) advance means carried by said base member and being operable by said lever arm; said advance means being adapted to advance said pressure arm through said base member in a manner such that said movable jaw member is advanced toward said stationary jaw member;

(h) releasable catch means carried by said base member for preventing rearward movement of said pressure arm; and

(i) lock means carried on said second end of said pressure arm; wherein said lock means is adapted to pivot said movable jaw member relative to said support means so as to lock said movable jaw member in a fixed position.

4,893,802

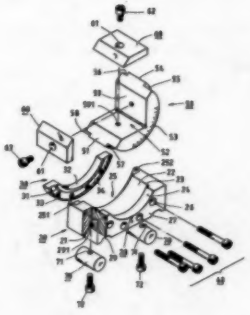
ANGLE-ADJUSTABLE WORKPIECE SEAT

Charles Lin, Taichung, Taiwan, assignor to Jason Wu, Taichung, Taiwan

Filed Jul. 14, 1988, Ser. No. 207,107

Int. Cl.[4] B23Q *1/04*

U.S. Cl. 269—74 **4 Claims**



1. An angle-adjustable workpiece seat comprising: a base having: a bottom surface, a top surface having a concavely arcuate primary supporting surface, a confining surface upwardly extending at an incline from a first arcuate side edge of said primary supporting surface towards a central portion of the primary supporting surface, a concavely arcuate receiving groove downwardly extending from a second arcuate side edge of said primary supporting surface, said receiving groove having at least a shoulder surface being in connection with said primary supporting surface and a stopping surface laterally extending from a bottom edge of said shoulder surface, a plu-

rality of holes extending parallelly in relation to each other and to an axis of curvature of said primary supporting surface, said plurality of holes extending through said shoulder surface a concavely arcuate secondary supporting surface extending laterally from the; a top portion of the confining surface with an axis of curvature coincident with said axis of curvature of the primary surface;

a substantially crescent shaped locking piece slidably positioned in said receiving groove, extending substantially over the length of said groove and having, said locking piece pressing surface being in connection with said primary supporting surface and being upwardly inclined toward the central portion of the primary surface, a second concavely arcuate secondary supporting surface extending laterally from a top portion of said pressing surface said second secondary supporting surface having an axis of curvature coincident with the axis of curvature of the primary surface: an arcuate shallow groove adjacent to said pressing surface: and a plurality of holes corresponding to said holes of said base extending from said groove; whereby said pressing surface, said primary supporting surface and said confining surface together form a sliding groove of dovetail cross-section;

a plurality of threaded elements respectively threaded through corresponding ones of said holes of said base and said locking piece, said threaded elements being capable of driving said locking piece to laterally translate in said receiving groove; and

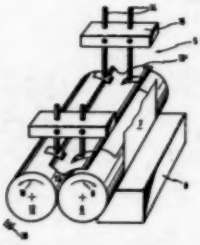
a sliding member having a substantially V-shaped top positioning surface, formed by two plane surface each surface having means for receiving a detachable pad piece said sliding member further including a bottom sliding rail of dovetail cross-section complementary to said sliding groove, having a primary sliding surface matching, slidable on said primary support surface, a contacting surface upwardly extending from one side edge of said sliding surface and capable of matching said pressing surface, and two secondary sliding surfaces for sliding on said secondary supporting surfaces respectively.

4,893,803

METHOD OF AND DEVICE FOR FOLDING A SHEET

Heino Petersen, Wabern, Switzerland, assignor to Eltex-Elektrostatik Gesellschaft mbH, Weil am Rhein, Fed. Rep. of Germany

Filed Jan. 16, 1987, Ser. No. 3,735
Int. Cl.[4] B42C 1/04
U.S. Cl. 270—47 **14 Claims**



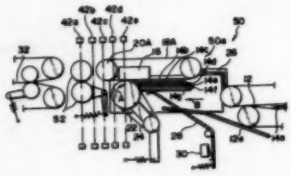
1. A method of folding a sheet cut from at least one advancing web of material bonded electrostatically on at least one side, comprising the steps of: transferring said sheet to a collecting cylinder; picking up said sheet in vicinity of a midline of said sheet by a folding cylinder resting against said collecting cylinder in a nip along said midline; drawing said sheet completely over said folding cylinder while folding both halves of the sheet together along said midline during rotation of said cylinders; rotating said cylinders in opposite directions; charging said web at least outside said cylinders if necessary; exerting a force of attraction in said nip by an electrostatic field, said electrostatic field producing a nonadhesive effect to prevent formation of corners during folding of said sheet, said nip being upstream with respect to the direction of rotation of said cylinders, said force being exerted on top of said sheet for pulling the sheet off in a direction opposite the direction of rotation of said collecting cylinder and moving said sheet toward a guide, so that the sheet is attracted and transferred to said folding cylinder, pulling off a part of the folded sheet in a direction opposite to the direction of rotation of the folding cylinder producing an adhesive effect.

4,893,804

APPARATUS FOR FEEDING SHEET ARTICLES

Tsutomu Sasage; Masahiko Noguchi; Hiroyuki Nagatani, and Toshiharu Kubota, all of Tokyo, Japan, assignors to NEC Corporation, Japan

Filed Jun. 29, 1988, Ser. No. 212,933
Claims priority, application Japan, Jul. 1, 1987, 62-101993[U]; Jul. 23, 1987, 62-185077
Int. Cl.[4] B65H 1/02, 7/14
U.S. Cl. 271—3.1 **6 Claims**



1. An apparatus for accumulating a plurality of sequential individual sheet articles temporarily in a feeder section of said apparatus and feeding the articles sequentially one by one out of said feeder section toward a subsequent processing stage, comprising:

upstream transport means for transporting the articles into said feeder section;

support and transport means for driving the articles coming in from said upstream transport means to said feeder section while supporting said articles;

stop means for stopping the articles arrived in said feeder section by causing said articles to abut against said stop means;

said stop means comprises a reverse belt against which the articles transported by said base belt abut to be stopped, and a reverse roller rotatable at a low speed in the opposite direction to an intended direction of article feed, said reverse belt being wound around said reverse roller;

suction transport means located to face said stop means at a spacing which accommodates only one of the articles for sucking and driving the articles to a downstream side;

suction means for supplying a sucking force to said suction transport means;

downstream transport means for transporting the articles which are sent out one by one by said suction transport means toward the subsequent processing stage one at a time by nipping said articles;

said downstream transport means comprises a downstream transport path and feed means interposed between said downstream transport path and said suction transport means for feeding the articles one by one to said downstream transport path, said feed means comprises a pick-up gap control roller pair which is controllable in rotation speed;

said gap control rollers situated in a position just past said suction transport means with respect to the intended direction of sheet feed;

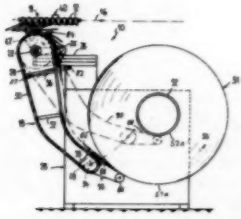
detector means for detecting an amount of the articles which have been stopped in abutment against said stop means;
drive control means for deactivating said upstream transport means when said detector means determines that the amount of the articles has reached a predetermined reference amount;
a plurality of sensor means;
a first of said sensor means being responsive to the leading edge of the article which has been nipped by said gap control rollers;
at least one second sensor means responsive to an interval between the article being transported by said downstream transport means and the next article; and
drive means for deactivating said suction transport means in response to a sense output of said first sensor means and reactivating said suction transport means in response to a sense output of said second sensor means.

4,893,805

TRANSPORT APPARATUS FOR PRINTED PRODUCTS AND USE OF SUCH TRANSPORT APPARATUS

Jürg Eberle, Hinwil, Switzerland, assignor to Ferag AG, Hinwil, Switzerland

Filed Aug. 22, 1988, Ser. No. 234,731
Claims priority, application Switzerland, Aug. 28, 1987, 319/87
Int. Cl.[4] B65H *29/04*
U.S. Cl. 271—204 **8 Claims**



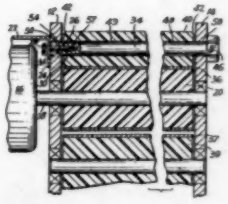
1. A transport apparatus for transporting printed products, especially newspapers arriving in an imbricated formation, comprising:
an individual conveyor for engaging the printed products for transport thereof in a predeterminate direction;
said individual conveyor being provided with a plurality of controlled grippers arranged at a substantially uniform spacing from one another for the clamping engagement of the printed products;
said individual conveyor defining a product removal region;
a driven endless revolving product removal conveyor moving substantially in the same sense as the individual conveyor at the region of the product removal location thereof;
said product removal conveyor being provided with controlled product removal grippers;
each of said product removal grippers engaging an associated printed product;
each of said grippers of said individual conveyor having a mouth opening;
each of said product removal grippers of said product removal conveyor having a mouth opening;
the mouth openings of said grippers and the mouth openings of said product removal grippers confronting one another;
means for controlling the grippers of the individual conveyor at the product removal location;
means for controlling the product removal grippers of the product removal conveyor;
said controlling means for the grippers of the individual conveyor and said controlling means for the product removal grippers of the product removal conveyor controlling said grippers and said product removal grippers, respectively, at the product removal region such that said grippers and product removal grippers are oppositely controlled in relation to one another;
said product removal conveyor comprising a driven endless traction element;
said product removal grippers of the product removal conveyor being arranged at a substantially uniform spacing from one another at the driven endless traction element;
each of said product removal grippers comprising a movable jaw and an associated fixed jaw;
means for pivoting the movable jaw of each product removal gripper into an open gripper position laterally of the associated fixed jaw and for pre-biasing the movable jaw in said open gripper position by a first resilient action;
each product removal gripper in a closed gripper position thereof having the movable jaw directed substantially in the same direction as the associated fixed jaw;
means for blocking the movable jaw of each product removal gripper in said closed gripper position by a second resilient action;
said second resilient action overcoming the first resilient action;
a shaft provided for each product removal gripper;
the movable jaw of each product removal gripper being secured to said shaft thereof;
cantilever means provided for each shaft and laterally protruding from said driven endless traction element;
each shaft being pivotably and axially displaceably mounted at the cantilever means thereof;
said means for pivoting the movable jaw of each product removal gripper comprises a compressible and torsionable helical spring surrounding the shaft of the associated product removal gripper;
said helical spring being pre-biased in a closing direction of the associated product removal gripper;
said helical spring in a relaxed and non-torsioned state thereof retaining the movable jaw in the laterally pivoted out position;
endless guide rail means;
said traction element being guided in said endless guide rail means;
a driven deflection wheel; and
said traction element being trained about said driven deflection wheel at the product removal region.

4,893,806

PINCH ROLLER DEVICE

Thomas McLaughlin, Ossining, N.Y., assignor to Technical Support Services, Inc., Ossining, N.Y.

Filed Jul. 25, 1988, Ser. No. 223,355
Int. Cl.[4] B65H *5/02*
U.S. Cl. 271—272 **6 Claims**



1. A method of correcting misfeeding of deposit envelopes in an Automatic Teller Machine having a pair of opposed, endless deposit envelope conveyor belts travelling between a pair of first and second identically fabricated frame members, said deposit envelopes being drawn into said machine by movement

of said conveyor belts with respect to one another, at least one of said conveyor belts being driven by a foam-like drive roller itself rotatably driven by a motor located outside of said frame members, said motor having a housing secured by a bolt and nut passing through a first aperture in a first of said frame members, comprising the steps of:

(a) removing said nut from said bolt to expose the threads of said bolt;

(b) locating a pinch roller between said frame members, above said foam-like drive roller;

(c) locating a pinch roller axle through a second aperture of said second frame member corresponding in position to said first aperture;

(d) locating said pinch roller axle through said pinch roller; and

(e) securing said pinch roller axle to said exposed threads of said bolt such that said pinch roller bears down on one of said conveyor belts against said foam-like drive roller.

4,893,807

PLAYGROUND SLIDE

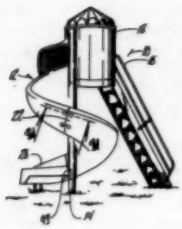
Paul W. Ahrens, Monett, Mo., assignor to Miracle Recreation Equipment Company, Monett, Mo.

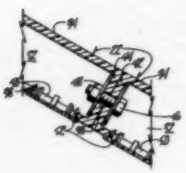
Continuation-in-part of Ser. No. 55,431, May 28, 1987, Pat. No. 4,811,943. This application Nov. 21, 1988, Ser. No. 273,948

The portion of the term of this patent subsequent to Mar. 14, 2006, has been disclaimed.

Int. Cl.[4] A63G *21/02*

U.S. Cl. 272—56.5 R **8 Claims**





1. A playground slide comprising,

a plurality of interconnected bedway sections,

a ground-supported post, and each of said sections including an integral sleeve portion telescopically engaging said post,

each of said bedway sections having a hollow interior construction, including top, bottom, opposite side and end walls,

said interconnected hollow bedway sections including said end walls on contiguous sections being opposed and interconnected by adjustable fasteners which extend into the interior of said hollow bedway sections,

said bedway sections having the interconnected opposed end walls having access openings in one of the adjacent walls of at least one of the bed sections to provide access into the interior of the hollow bedway sections for adjustment of the fasteners, and

a cap is provided on each of said access openings to give a finished smooth appearance to said one wall and conceal said fasteners within said hollow section.

4,893,808

EXERCISE APPARATUS FOR THE NECK

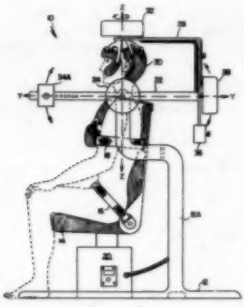
Donald R. McIntyre, P.O. Box 23, Polks Landing, Chapel Hill, N.C. 27514; Paul J. Hollahan, 109 Turnage Ridge Rd., Chapel Hill, N.C. 27514, and James A. Sawhill, 408 N. Hayes, Moscow, Id. 83843

Filed Jan. 26, 1988, Ser. No. 148,665

The portion of the term of this patent subsequent to Mar. 1, 2005, has been disclaimed.

Int. Cl.[4] A63B *23/00*

U.S. Cl. 272—94 **14 Claims**



1. An apparatus for exercising the neck of a user and comprising:

a stationary frame having two upwardly extending posts;

an adjustable seat secured to said frame for positioning a user between said two posts;

a neck exercise assembly pivotably mounted to said posts and including a pivotably movable Ushaped support member having an arm extending forwardly and rearwardly on each side of a user positioned in said seat, and an adjustable length inverted L-shaped member extending generally upwardly therefrom for securing the head of a user, said U-shaped support member being pivotably movable relative to said frame about a horizontal axis which corresponds to an axis of rotation which is coaxial with the axis of flexion/extension movement of the neck, and said adjustable length inverted L-shaped member for securing the head being pivotably movable relative to said U-shaped support member about an axis of rotation which is generally perpendicular to said horizontal axis and coaxial with the axis of lateral flexion movement of the neck;

a head engagement pivotably mounted to said adjustable length inverted L-shaped member for securing the head, said head engagement device being adjustable relative to said U-shaped support member and pivotably movable relative to said inverted L-shaped member about a vertical axis which is generally perpendicular to said horizontal axis and coaxial with the axis of rotation movement of the neck;

first resistance means operatively connected to and cooperating with said U-shaped support member of said neck exercise assembly for resisting flexion/extension movement of the neck of a user;

second resistance means operatively connected to and cooperating with said inverted L-shaped member of said neck exercise assembly for resisting lateral flexion movement of the neck of a user;

third resistance means operatively connected to and cooper-

ating with said head engagement device for resisting rotational movement of the neck of a user;

a counterweight operatively secured to said U-shaped support member;

a counterweight operatively secured to said inverted L-shaped member; and

restraint means for securing the user to said seat during exercise of the neck;

whereby said neck exercise assembly and said head engagement device carried thereby permit simultaneous multi-axial pivotal movement of the neck about its natural axes, said adjustable seat and adjustable inverted L-shaped member for securing the head allowing for coalignment of the axes of rotation of the exercise apparatus with the natural cervical axes of flexion/extension, lateral flexion and rotation, and said counterweights rendering the exercise assembly gravity independent.

4,893,809

JUMP BALL

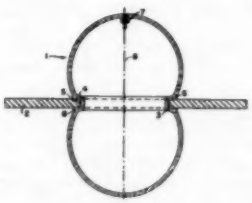
Joseph L. Blankenzee, Bodegraven, Netherlands, assignor to Interchain N.V., Curacao, Netherlands Antilles

Filed Aug. 4, 1986, Ser. No. 892,949

Claims priority, application Netherlands, Aug. 5, 1985, 8502188; Oct. 2, 1985, 8502690

Int. Cl.[4] A63B *25/08*

U.S. Cl. 272—114 **7 Claims**



1. Recreational apparatus comprising an inflatable ball body of elastic material of sufficient strength to support the weight of a person and a rigid annular plate operatively coupled to said ball body and of sufficient strength to support the weight of a person, and means for mechanically interlocking said ball body and said plate when said ball body is inflated so that said plate is disposed intermediate the top and the bottom of the ball body and constrained from movement in an axial direction with respect to said ball body, said means for mechanically interlocking said ball body and said plate comprising male and female profile parts, said female profile parts being integral with said ball body and comprising an annular groove, the bottom of said groove facing generally outwardly, said male profile part comprising a portion of said plate and adapted to fit into said groove and to seat therein when said ball body is inflated, the cross-section of said groove being defined by outwardly extending walls of said ball body, said walls having thickened portions at their radial outward extremes for supporting said plate and the weight of a person.

4,893,810

QUICK RELEASE COLLAR

Scott H. Lee, R.R. 2, Box 10, Church St., Putnam, Conn. 06260

Continuation of Ser. No. 163,131, Feb. 23, 1988, abandoned, which is a continuation of Ser. No. 888,516, Jul. 21, 1986, abandoned. This application Dec. 9, 1988, Ser. No. 282,876

Int. Cl.[4] A63B *13/00*

U.S. Cl. 272—123 **18 Claims**

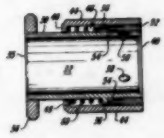
1. A quick release collar adapted to be axially received on and to be removably fixed at any selected location along the length of an elongated element, comprising:

a collar body having an axially extending passage extending therethrough for receiving said element, a radially outwardly extending first flange on the outer surface of said collar body, and a plurality of radial openings in said collar body;

radially movable balls located within the openings in said collar body;

a sleeve surrounding said collar body and defining a space therebetween, said sleeve including a second flange extending radially inwardly toward said collar body at a location spaced axially from said first flange;

a tension ring integrally associated with and surrounded by said sleeve, said tension ring being located in the space between said sleeve and said collar body, said sleeve and said tension ring being axially slidable as a unit with respect to said collar body between a locked position and an unlocked position, said tension ring having an end portion



with a tapered inner surface, said tapered inner surface having a relatively small dimensioned segment which urges said movable balls radially inwardly into said passage in the locked position, and having a relatively large dimensioned segment accommodating radial movement of said movable balls out of said passage in the unlocked position; means for accomodating radial flexure of substantially the entire length of said end portion in relation to both said collar body and said sleeve; and,

biasing means positioned in said space between said first and second flanges for normally biasing said sleeve and said tension ring axially with respect to said collar body toward the locked position, said tension ring and said first flange being coactively engageable to limit the extent of movement of said sleeve and said tension ring toward the locked position.

4,893,811

EXERCISER

Clayton D. Dilmore, 8325 Capps Ave., Northridge, Calif. 91324

Filed Jan. 12, 1989, Ser. No. 295,993

Int. Cl.[4] A63B *21/24*

U.S. Cl. 272—129 **1 Claim**

1. An exerciser comprising:

a stand adapted to be fixedly located on a supportive surface, said stand including a ceiling section adapted to be located in a vertically spaced position above a human being user;

a sheet material cover fixed on said ceiling section, said sheet material cover having an inner chamber, a mounting plate being fixedly mounted on said sheet material cover, said mounting plate being located within said inner chamber;

a plurality of electromagnets mounted on said mounting plate

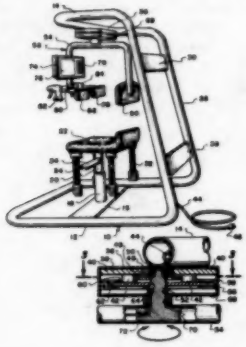
a shaft mount fixedly mounted on said cover, said mounting plate including a central enlarged hole, said shaft mount located within said enlarged hole, a bearing assembly mounted within said shaft mount;

a shaft having an inner end and an outer end, said inner end connecting with said shaft mount, said shaft being rotationally supported by said bearing assembly, said outer end being fixed to a tubular member, pivotal movement of said tubular member is permitted by the rotational mounting of said shaft on said shaft mount;

said sheet material cover having a peripheral inwardly ex-

tending flange, said flange defining an enlarged opening, said electromagnet being partially located within said enlarged opening;

a metallic plate fixed to said shaft, said metallic plate covering said enlarged opening with the peripheral portion of said metallic plate abutting against said flange, said metallic plate being slightly spaced from said electromagnet with said flange preventing said metallic plate from deflecting and connecting said electromagnet;



said electromagnet and said metallic plate are adapted to supply a resistance in response to an electrical energy; and

said tubular member permits said user to simultaneously rotate said shaft in either clockwise or counterclockwise direction and work against said resistance, whereby when said electrical energy is increased to said electromagnets, the amount of resistance is increased.

4,893,812

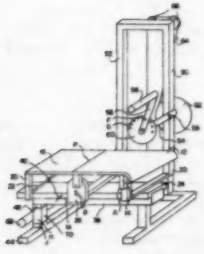
ADJUSTABLE MULTIPURPOSE TRUNK EXERCISER

Fredric O. Dawson, Jr., and Matthew F. Dawson, both of 1401 Newport Ave., San Jose, Calif. 95125

Filed Jan. 28, 1988, Ser. No. 71,492

Int. Cl.[4] A63B *21/00*

U.S. Cl. 272—134 **3 Claims**



1. An exercise apparatus comprising:

a frame;

a lever means including a rotatable shaft fixed to said frame and a lever arm having a first end attached perpendicularly to said shaft and a second end to which a handle means is attached;

a resistance means coupled to said lever means for providing a force opposiong rotation of said lever means;

a bench means including a first bench portion mounted on said frame, said first bench portion having a first end and a second bench portion having a quick detachable means for removably mounting said second bench portion to the first end of said first bench portion; and,

a bench support means mounted on said frame for adjustably supporting the first end of said first bench portion in a plurality of locations.

4,893,813

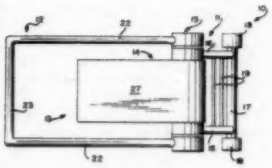
BACK EXERCISE DEVICE

Christopher Murray, 2007 South Rd., Baltimore, Md. 21209, and Binyamin Rothstein, 3213 Shelburne, Baltimore, Md. 21208

Filed Sep. 16, 1988, Ser. No. 245,262

Int. Cl.[4] A63B *1/02*

U.S. Cl. 272—145 **10 Claims**



4. An exercise device for a human user, comprising:

a platform comprising an interior relatively rigid core with cushioning means surrounding said core for supporting a user's torso;

a first support having a pair of parallel legs with a cross bar extending therebetween adjacent a first, bottom, end thereof;

a second support having a pair of parallel legs with at least one cross bar extending therebetween;

means for pivotally connecting said first and second supports for movement with respect to each other for changing the angular relationship between said first and second supports;

stop means for positively stopping said first and second supports so that they cannot move any further angularly with respect to each other; and

means for mounting said platform so that it is movable with respect to said supports and operatively positively supported thereby in at least first and second positions;

said platform including a pair of arms extending outwardly from the core thereof, and having free ends opposite said core; and wherein said means for mounting said platform receives said arms to positively support said arms in either a first position, in which said platform extends downwardly at an angle to the horizontal, or a second position, in which said platform extends generally horizontally; and said stop means including a pair of channel shaped members, one stationarily mounted to each of said first and second supports on the outside thereof adjacent said means for pivotally connecting said supports together.

4,893,814

PLASTIC CANDLEPIN CONSTRUCTION

Albert N. Bertozzi, P.O. Box 478, Pawtucket, R.I. 02860

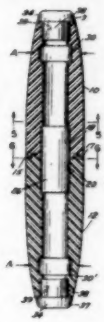
Filed Feb. 8, 1988, Ser. No. 153,354

Int. Cl.[4] A63B *9/00*

U.S. Cl. 273—82 R **2 Claims**

1. A bowling pin having a body defining curved sides tapering from a central portion to each end, said pin having two mating halves joined at a medial point by interlocking edges, said pin having a substantially hollow core defined by hollow walls, said central portion having a central counterbore extending inwardly from the mating interlocking edges, said central portion containing dense material secured to the hollow walls thereof, bases affixed to each end of said body closing the hollow core, the hollow walls remote from the inner

portion of the bases being thinned substantially at the strike zone thereof to provide a lively pin, the thinning and central



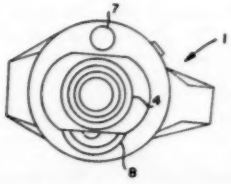
counterbore compensating for the weight added at the central portion of the pin said dense weight equaling the removed material from the core of the pin.

4,893,815

INTERACTIVE TRANSECTOR DEVICE COMMERCIAL AND MILITARY GRADE

Larry Rowan, 3440½ Caroline Ave., Culver City, Calif. 90230

Filed Aug. 27, 1987, Ser. No. 90,036
Int. Cl.[4] F41B *15/04*
U.S. Cl. 273—84 ES **13 Claims**



1. A transector system for tracking and neutralizing a designated target body, including:

sensing means for sensing signals associated with any body within the range of the system and producing an output signal characteristic of that body;

central computer means including signal processing means coupled to said sensing means and responsive to said output signal to digitize and store the same;

said computer means including, in addition, repertoire storage means and comparator means;

said repertoire storage means having stored therein digitized signals representing the signals emanating from the target body;

said comparator means being coupled to said sensing means and to said repertoire storage means for comparing output signals from said sensing means with said stored digitized signals in said repertoire storage means and for producing a lock-on output signal when said output signal from said sensing means corresponds to said digitized signal representing said target body;

said signal processing means including means to determine the range, azimuth and elevation of each body, the signals from which are being sensed, and, in particular, producing a digital location signal representative of the location of the target body when the lock-on signal occurs;

projectile means including a projectile computer, said projectile computer having projectile signal-processing means and volatile storage means therein;

said volatile storage means being coupled, before launch of said projectile, to said signal processing means for updating said projectile computer with the latest digitized target body location signal;

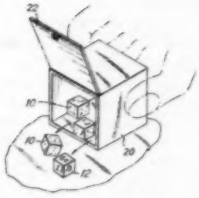
said projectile computer including an expert program for controlling said projectile signal-processing means and for controlling the flight of said projectile.

4,893,816

COMPETITIVE DICE AND CUBE GAME

Hal Levy, and Brett M. Levy, both of 165 West End Ave., New York, N.Y. 10017

Continuation-in-part of Ser. No. 155,080, Feb. 11, 1988, abandoned. This application Dec. 23, 1988, Ser. No. 289,805
Int. Cl.[4] A63F *9/04*
U.S. Cl. 273—146 **8 Claims**



1. A method of playing a game utilizing dice and a doubling cube comprising the steps of:

providing a objective total cumulative count to win the game,

assigning a value to each face of the dice,

establishing a value for each throw of the dice relating to the value assigned to each face of the cube of the dice,

establishing an initial entry level to allow a player to continue accumulating and maintaining a cumulative count according to the throw of the dice,

allowing a player to selectively stop at a retained cumulative count which is in excess of the initial value at any time during the player's turn,

commencing the accumulation of said count during the player's next turn and allowing the player to selectively stop his turn at a second retained cumulative count,

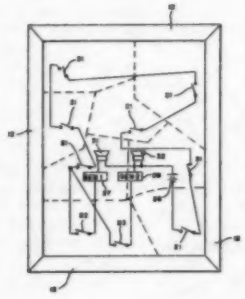
returning the count to the last stopped cumulative count depending upon the value of the throw of the dice whereby said player surrenders the newly accumulated count above that of the last set cumulative count and recommences his next turn at the last set cumulative count,

providing a doubling cube to be selectively used by the player whose turn is about to begin, the player offering the doubling cube to the opponent whereby the stakes of the game are doubled if the opponent accepts the doubling cube or the game is won by the player if the opponent refuses to accept the doubling cube,

the doubling cube remaining in the possession of the opponent for so long as the game continues or is offered to the first player by the opponent to redouble the stakes of the game,

the game being won at the stakes then operative in the game by the use of the doubling cube when either player reaches the total objective cumulative count or a player refuses to accept the doubling cube.

4,893,817
MUSICAL JIGSAW-TYPE PUZZLE
Ronen Shilo, 1575 Tenaka Pl. #01, Sunnyvale, Calif. 94087
Filed Oct. 17, 1988, Ser. No. 258,822
Int. Cl.[4] A63F 9/10
U.S. Cl. 273—157 R **4 Claims**



1. A jigsaw-type puzzle comprising a base having edge frame members, a plurality of irregularly-shaped puzzle pieces each having a portion of a picture on its upper face, said puzzle pieces being shaped to fit together resting on said base within said frame members, at least some of said puzzle pieces having switch actuating means, said base having switch means in positions corresponding to said switch actuating means when said puzzle pieces are fitted together, said switch actuating means and said switches co-acting to close said switches when positioned in proximity to each other, a source of power, an electrical device, wiring to connect in series said switch means, said source of power and said electrical device, whereby said electrical device is energized only when all said puzzle pieces are fit together to fill the area above said base and within said frame members, a second plurality of second irregularly-shaped puzzle pieces each having second switch actuating means and a key puzzle piece having third switch actuating means, said base having second switch means and a second electrical device connected thereto, said second switch means and said second electrical device being in series with said source of power and said amplifier and to all but one of said first-mentioned switches, said second switch actuating means corresponding in position to all but one of said first-mentioned switch-actuating means when said second puzzle pieces are fit together to fill the area above said base and within said frame member, said third switch actuating means being positioned in proximity to said second switch means, whereby said second electrical device is energized and said first-mentioned electrical device is not energized.

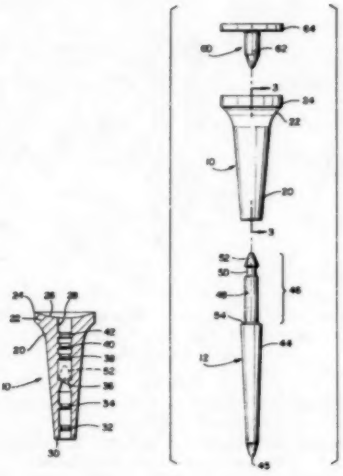
4,893,818
GOLF TEE
Patrick Liccardello, P.O. Box 23475, Albuquerque, N. Mex. 87192-1475
Filed Aug. 3, 1988, Ser. No. 227,984
Int. Cl.[4] A63B 67/14
U.S. Cl. 273—212 **6 Claims**

1. A golf tee comprising

an elongated body portion made of a soft plastic material, said body having an axial bore and a concaved ball support surface at one end thereof,

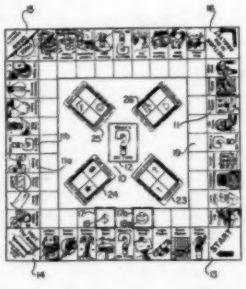
a stem made of a hard plastic material, said stem including a point for ground penetration at one end and an integral spear at its other end,

said spear including a shaft having a conical tip, said shaft having an annular groove adjacent said tip, and



at least one annular ridge disposed within said bore engaging said groove and thereby retaining said spear within said bore of said body portion.

4,893,819
PERSONALITY TYPE BOARD GAME
Donald A. Wright, 56 Dakota Drive, Oromocto New Brunswick, Canada E2V 1L4
Filed Mar. 1, 1988, Ser. No. 162,812
Int. Cl.[4] A63F 3/00
U.S. Cl. 273—243 **17 Claims**



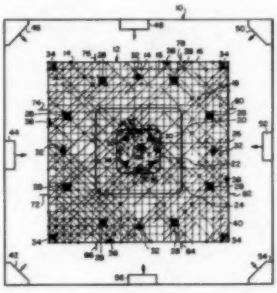
6. A board game as in claim 5 comprising board markers matching the Feature Squares and adapted to be randomly arranged on the board, as well as, stored on each player's Personality Type Tabulator when acquired by a player.

4,893,820

GAME APPARATUS AND METHOD

Andrew Silverman, 313 Thunder Circle, Bensalem, Pa. 19020

Filed Sep. 1, 1987, Ser. No. 91,899
Int. Cl.[4] A63F 3/00
U.S. Cl. 273—249 5 Claims



1. A game apparatus, comprising:

a playing board having a grid of interconnected segments depicted thereon for defining a plurality of selectable player movement paths, said grid further having unique indicia thereon;

a grid position marker for each plyaer;

a set of progress markers for each player, the progress markers of each set corresponding by unique and respective features to indicia on the movement grid;

a plurality of movement direction markers, each defining at least one direction of movement on the grid, from which sets of movement direction markers can be accumulated by each player by random selection for subsequent use in repositioning each grid marker in turn;

first chance means for defining a magnitude of movement for repositioning each grid marker in turn, whereby players may coordinate the direction markers and the first chance means to move respective position markers on the grid and collect progress markers; and,

second chance means bearing indicia corresponding to the unique indicia of the progress markers, whereby progress markers may be forfeited and collected between respective players.

5. A method for competing as a player in a game, of the kind played on a grid having a plurality of interconnected segments defining a plurality of selectable player movement paths, comprising the steps of:

accumulating movement direction markers by random selection from a set of such markers, each player receiving an initial subset of said direction markers to and from which subsequent direction markers will be added and removed as play proceeds, each of the direction markers defining at least one direction of movement of the grid;

successively moving a position marker on the grid, in turn by:

selecting one of the direction markers from the subset to define the direction of movement; and,

operating a first chance means to define a magnitude of movement in the selected direction;

collecting a set of progress markers, the progress markers corresponding by unique and respectve features to indicia on the grid, by successively moving the position marker to the unique indicia; and,

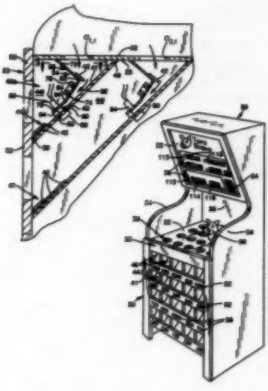
selectively collecting progress markers from another player by operating a second chance means bearing indicia corresponding to the unique indicia of the progress markers.

4,893,821

SCORING SYSTEM FOR GAME APPARATUS

Mariano deOrbegoso; Jane Moe, both of Sheridan, and Chris Masterson, Beaverton, all of Oreg., assignors to Non Plus Ultra, Inc., Sheridan, Oreg.

Filed May 6, 1988, Ser. No. 190,712
Int. Cl.[4] A63F 7/30
U.S. Cl. 273—371 4 Claims



1. In a game apparatus that includes a target member that has a plurality of openings, wherein the openings are formed to receive tokens that are pitched toward the target member, and wherein the openings are arranged on the target member in a matrix of multiple rows and multiple columns, a scoring system comprising:

a plurality of chutes, each chute having a first end connected to the target member near an associated opening and configured to move tokens that are pitched into the associated opening through a detecting passage formed within the chute;

a sensor fastened to each chute and selectively activated for providing on one of a plurality of output lines a first detection signal whenever a token passes through the detection passage of the chute to which the sensor is fastened; each column of sensors being connected to a common output line; and

score control means for:

(a) sequentially activating each row of sensors;

(b) simultaneously monitoring the output lines to receive a first detection signal provided by any of the sensors associated with the activated row of sensors;

(c) generating a score signal in response to the received first detection signals, the score signal including the particular detection passage through which each pitched token moves.

4,893,822

ELECTRONIC THROWING DART FOOTBALL

J. Rudolph Tess, and George Spector, both of 23 Broadway, Rm. 3615, New York, N.Y. 10007

Filed Jul. 27, 1984, Ser. No. 635,432
Int. Cl.[4] F41J 5/02
U.S. Cl. 273—376 2 Claims

1. A throwing dart football game which comprises :

(a) a vertical football playing field board having a plurality of yard indicating lines;

(b) a dart board having a plurality of moveable spring loaded pie shaped scoring pieces and a touchdown bulls-eye piece activated by a dart, said dart board is mounted in center of said football playing field board;

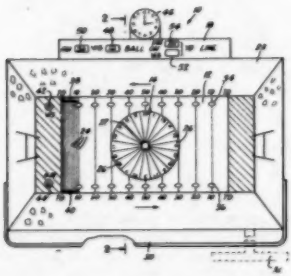
(c) a plurality of contact members, each said contact member

is located on back of each said pie shaped scoring piece and said touchdown bulls-eye piece;

(d) a score board mounted above said football playing field board;

(e) a plurality of darts to be thrown by players at said dart board to make contact with said pie shaped scoring pieces and said touch-down bulls-eye piece thereby activating said contact members;

(f) means responsive to activation of contact members for carrying information between said activated contact members and said score board and automatically registering and displaying said information on said score board to indicate to said players the status of play of said football game, said means including a spaced pair of aligned indicators on each side of the board indicating ball positions and including score indicators coordinated with the ball positions and information conveyed as a result of a thrown dart hitting a particular scoring piece;



(g) two sets of intermediate yard round shaped indicating lamps one said set placed above said dart board on each said intermediate yard indicating line for one team and other said set placed below said dart board on each said intermediate yard indicating line for other team;

(h) two switches mounted to said football playing field board, each said switch to control one said set of ten yard football shaped indicating lamps and one said set of intermediate yard round shaped indicating lamps; and

(i) means for carrying information electronically between said activated contact members and said ten yard football shaped indicating lamps and said intermediate yard round shaped indicating lamps to automatically display said information on said football playing field board to indicate to said players the position of football on said football playing field board and the score after each dart is thrown.

4,893,823

SEAL ASSEMBLY

Gary L. Stroune, Telford, and Thorval L. Berg, Hatfield, both of Pa., assignors to Greene, Tweed & Co., Kulpsville, Pa.

Filed Dec. 21, 1988, Ser. No. 287,958

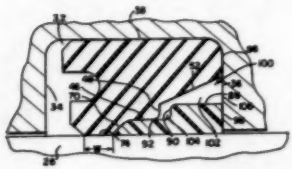
Int. Cl.[4] F16J 9/06, 15/32

U.S. Cl. 277—165 **4 Claims**

1. A seal assembly for installation in an annular groove having an inner radial surface and an outer radial surface interconnected by an axial surface, the seal assembly comprising:

a generally annular energizer element formed of an elastomeric material including a body portion and a generally radially extending sealing lip to provide a low pressure seal when installed within the groove, the energizer element engaging at least a portion of the axial surface of the groove and a first portion of the outer radial surface of the groove proximate the axial surface of the groove, the sealing lip extending beyond the groove for engagement with an element to be sealed to define a low pressure sealing lip contact area of a first predetermined axial width; and

a generally annular heel bearing element formed of a generally rigid material to provide a high pressure seal when installed within the groove, the heel bearing element engaging at least a portion of the energizer element proximate the sealing lip and engaging a second portion of the outer radial surface of the groove distal from the axial surface of the groove, a portion of the heel bearing element engaging the element to be sealed with the energizer element, the heel bearing element and a third portion of the outer radial surface of the groove extending between the first and second portions thereof establishing a first generally annular void, the annular void being generally triangular in cross section whereby upon the application



of pressure below a first predetermined pressure limit the sealing lip of the energizer element functions to perform primary sealing and upon the application of pressure at or above the predetermined pressure limit the energizer element is compressed and a portion of the energizer element moves into the annular void, drawing at least a portion of the sealing lip into the groove to reduce the axial width of the low pressure sealing lip contact area and applying radial pressure upon the heel bearing element so that the heel bearing element performs the primary sealing function, the shape and location of the annular void being such that fluid within the annular void is forced out of the annular void by the energizer element and passes out of the groove between the outer radial surface of the groove and the heel bearing element.

4,893,824

HAND TRUCK FOR FILE CABINETS

John E. Turek, Hastings, and Carl J. Schoberg, Zumbro Falls, both of Minn., assignors to Liberty Diversified Industries, New Hope, Minn.

Filed Sep. 9, 1988, Ser. No. 242,323

Int. Cl.[4] B62B 1/14

U.S. Cl. 280—47.27 **15 Claims**

1. A hand truck for transporting an article such as a file cabinet, said article having a top surface and a bottom surface and a height measured therebetween, said article further having a front side and a back side and a depth measured therebetween, said hand truck comprising:

a generally upright frame, said frame having a top end and a bottom end and a height measured therebetween, a pair of opposing sides and a crossbar extending therebetween, said frame further defining a generally upright forward facing retention plane;

a handle section, said handle section being connected to said frame proximate to the top end thereof;

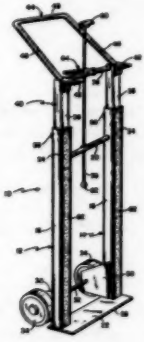
a toe plate, said toe plate connected to and extending forwardly from said frame proximate to the bottom thereof, said toe plate having a top planar surface oriented generally perpendicular to said retention plane;

a pair of wheels, each said wheel being rotatably mounted to one of said opposing sides of said frame proximate to the bottom thereof, said wheels extending generally rearwardly from and said frame;

a retaining arm, said retaining arm having a distal end includ-

ing a gripping means connected thereto, said retaining arm being mounted on said frame for pivotal movement relative to said frame such that said distal end of said retaining arm may be pivoted in a vertical plane generally perpendicular to said retention plane, said retaining arm also be mounted for longitudinal sliding movement relative to said frame simultaneously with said pivotal movement; and

a clamping assembly, said clamping assembly being connected to said frame, said retaining arm being connected to said clamping assembly, said clamping assembly including a collar mounted on said crossbar for rotational movement about said crossbar, a housing connected to and carried on said collar for rotational movement about said crossbar, said housing further including at least one aperture through which said retaining arm is slidably inserted,



a clamping means, said clamping means being connected to said housing and capable of exerting a clamping force upon said retaining arm to prevent said retaining arm from moving slidably through said aperture in said housing and longitudinally relative to said crossbar, and means for selectively releasing said clamping means,

whereby the toe plate of the hand truck may be inserted under the article with the front side of the article closely confronting the retention plane of the frame, and the retaining arm may be pivoted forwardly and downwardly and slidably moved forwardly relative to the frame so that the distal end of the retaining arm extends across the top surface of the article and the gripping means engages the back side of the article to retain and secure the article in contact with the toe plate and the retention plane when the hand truck is tilted backward onto the wheels.

4,893,825

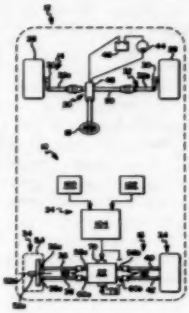
CONTROLLED COMPLIANCE FOR REAR WHEEL STEERING

David A. Janson, Plymouth, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Sep. 2, 1988, Ser. No. 240,881
Int. Cl.[4] B62D 6/04
U.S. Cl. 280—81.6 **7 Claims**

1. An apparatus for varying the steer angle of rear wheel assemblies of a vehicle having longitudinal and transverse axes and steerable front wheels, each wheel assembly including a wheel mounted for rotation and track parallel to the longitudinal axis on a stub axle supported from the vehicle chassis by at least pairs of transverse and substantially parallel swing links pivotally attached at one end to the wheel assembly ahead of and to the rear of the axle center line; the apparatus comprising:

rear steer means including means for mounting the other end of at least one of each pair of links for movement transverse to the vehicle, means for biasing the transversely movable ends in opposite direction transverse to the vehicle, and latch means having a first position locking the movable ends in a position wherein the rear wheels track



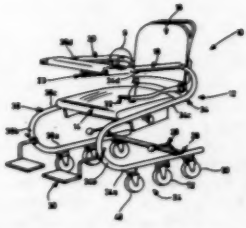
parallel to the longitudinal axis and a second position allowing the movable ends to move transverse in the same direction in response to transverse forces acting on the rear wheels.

4,893,826

MOBILITY SUPPORT DEVICE

Adele E. Ward; J. R. Kingsley Ward, both of Richmond Hill; Kevin R. Lunau; Jeffrey D. Stringer, both of Mississauga; John H. Royce, Kleinberg, and A. Edward Moore, L'Acadie, all of Canada, assignors to Canhart Industries, Inc., Richmond Hill, Canada

Filed May 6, 1987, Ser. No. 46,828
Int. Cl.[4] A61H 3/04
U.S. Cl. 280—87.021 **36 Claims**



1. A mobile support device for a handicapped person and rollable along a reaction surface, the mobile support device comprising:

first and second longitudinally extending frame sections oriented in spaced relationship, each of said frame sections having a lower portion and a front portion;

joining means for joining said first and second frame sections together;

a back support portion extending between and coupled with the first and second frame sections;

a seat portion secured to and extending between the first and second frame sections and centrally disposed above said lower portions; and

a wheel assembly mounted on said lower portions so as to engage the reaction surface, said wheel assembly including a pair of front caster wheels, a pair of rear caster wheels, and a pair of central wheels, each of said central wheels having a fixed transverse axis of rotation and being positioned intermediate said front and rear caster wheels

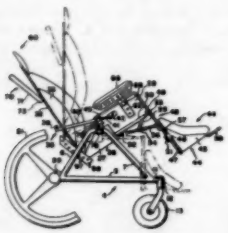
to inhibit transverse motion, each of said frame sections carrying one of said front caster wheels, one of said central wheels, and one of said rear caster wheels, said front and rear caster wheels and said central wheel on each of said frame sections being substantially aligned in parallel with a central longitudinal axis of said mobility support device, each of said wheels having a lower most tangent lying in a common plane, said spaced frame sections defining a free region in front of and beneath said seat portion through which a user's feet can reach said reaction surface and provide a propelling force to said mobility support device, said wheels being disposed outside said free region, and said wheel assembly constituting means to inhibit rocking of said mobile support device about said central wheels so that contact between all of said wheels with said reaction surface is maintained, the front portions of said frame sections being spaced from one another and said joining means being arranged so that unrestricted access is provided for the handicapped person to said seat portion, said back support portion, and to said free region.

4,893,827

CHAIR CONSTRUCTION FOR INCAPACITATED PERSONS

Dwight S. Gay, Fenton, and John W. Hoornstra, Vassar, both of Mich., assignors to Gunnell, Inc., Vassar, Mich.

Filed Aug. 31, 1988, Ser. No. 238,861
Int. Cl.[4] A61G 5/00
U.S. Cl. 280—250.1 **31 Claims**



1. An incapacitated person's chair construction comprising frame means; body support means having a seat member and a back member; hinge means coupling said seat and back members to one another; and pivot means rockably connecting said support means to said frame means, said hinge means enabling relative pivotal movement of said seat and back members and said pivot means enabling conjoint tilting of said seat and back members relative to said frame means, said pivot means being separable enabling separation of said support means and said frame means.

4,893,828

BOAT TRAILER ROLLER BUNK APPARATUS

Byron L. Godbersen, Lake LaJune Estates, Ida Grove, Iowa 51445

Filed Dec. 29, 1988, Ser. No. 292,217
Int. Cl.[4] B60P 3/10
U.S. Cl. 280—414.1 **6 Claims**

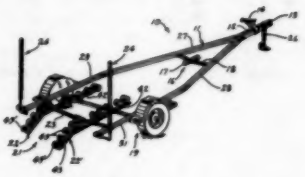
1. In a trailer for hauling a boat having a hull with a trim tab at its rear, the trailer having a wheel and axle supported frame including a pair of frame members extended rearwardly from a tongue connection in a diverging then parallel and laterally spaced manner, a cross member assembly extended between the frame members adjacent the axle, a roller bunk apparatus comprising:

roller bunk means disposed on either side of the longitudinal axis of the frame;

means mounting each said roller bunk means to the cross member assembly;

each said roller bunk means including elongated tubular means disposed longitudinally of the frame and parallel a frame member, said tubular means having front and rear portions;

roller carrying means mounted on each of said front and rear end portions for engaging the hull of the boat being carried by the trailer, one of said roller carrying means pivotally movable on said tubular means;



and further wherein said one roller carrying means is pivotally mounted on said rear end portion;

and further wherein each roller carrying means includes an elongated element connected to each said front and rear end portions;

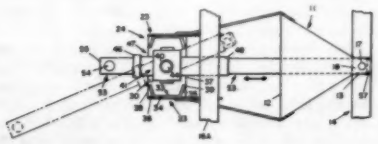
and further wherein each element embraces a said end portion in a nested manner, said one roller carrying means retaining said nested condition while being pivotally movable.

4,893,829

SELF ALIGNING COUPLING APPARATUS

Darrel B. Davis, 170 Macleay Rd., Sequim, Wash. 98382

Filed Mar. 3, 1989, Ser. No. 318,764
Int. Cl.[4] B60D 1/00
U.S. Cl. 280—479.2 **10 Claims**



1. A self aligning coupling apparatus for mounting on a towing vehicle or a towed vehicle whereby the self aligning means will apply equally as well on either vehicle to couple the other vehicle, comprising:

a funnel having an entrance and exit, a top, bottom and sides suspended longitudinally under a vehicle frame, including a first hole through the top side of the exit end for a latch connection,

a cradle-like strap support with the intermediate portion of the opposite ends secured to the bottom side of the exit and having the opposite end attached to the frame,

a pair of longitudinally extending straps with inner ends and outer ends secured to the opposite sides of the entrance end of the funnel,

a first housing comprising spaced L-shaped end plates having a horizontal portion attached to the outer ends of the longitudinal straps and the vertical portion extending upward to a straddled end attachment around said frame, and including spaced top and bottom plates having inner and outer side edges and opposite ends connected to the inside horizontal portion of the L-shaped ends, and a second hole bored centrally through the top and bottom plates,

a second housing mounted between said top and bottom

plates comprising spaced horizontal plates joined at opposite ends to spaced vertical plates, the vertical plates having a third hole bored centrally therethrough and including a pair of opposite gimbal axles mounted on the horizontal plates rotatably inserted in the second holes provided in the first housing,

an elongated sleeve constructed similarly to the second housing with horizontal and vertical plates having an outer end secured within said second housing and an inner end extending beyond the inner edges of said top and bottom plates, and including a gimbal axle mounted centrally on each vertical plate inserted rotatably in the third holes,

an elongated coupler slidably enclosed in the sleeve having a hitch connection on an outer end and a hole through the top side of an inner end, the inner end adapted to slide angularly into the entrance of said funnel for a locking engagement therein urged by the direction of thrust applied by the backing vehicle on the coupled hitch of the towing vehicle and towed vehicles,

a latch pin enclosed in the fourth hole having an end portion with a rounded tip projecting outside of said hole adapted to plunge in to the first hole in said funnel when said inner end of said coupler enters said exit end to lock each together,

a coiled spring attached in said fourth hole adopted to exert upward end pressure on the latch pin,

a lever having a fifth hole on the upright end, the lower end being secured in a pivot mounted on the top side of said funnel exit, and including an arcuate extension having a lower end arranged to enter said first hole,

a drive rod extending from an inner end connection in the fifth hole to an outer end on a side of one of said housing end plates, said end plate including an eyebolt fastened thereto for receiving the outer end of the rod therethrough, and

a handle attached to said outer end for pushing or pulling the rod whereby in pulling said rod the lever pivots to drive the arcuate extension into said first hole to purge the tip portion of the latch pin therefrom to release said coupling from said funnel.

4,893,830

APPARATUS FOR THE RETENTION OF A BOOT ON A SKI

Josiane Dunand, Cran-Gevrier; Paul Arnulf, Alby sur Cheran, and Denis Gasquet, Annecy, all of France, assignors to Salomon S.A., Annecy Cedex, France

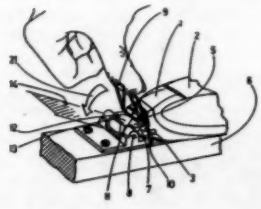
Continuation of Ser. No. 832,700, Feb. 25, 1986. This application Feb. 8, 1989, Ser. No. 307,533

Claims priority, application European Pat. Off., Mar. 5, 1985, 85400413

The portion of the term of this patent subsequent to Aug. 15, 2006, has been disclaimed.

Int. Cl.[4] A63C *9/00*

U.S. Cl. 280—615 **39 Claims**



1. A cross-country ski binding for the retention of a shoe or boot on a ski comprising a mobile lock for engaging a front portion of said shoe or boot for retaining said front portion of said shoe or boot on a ski and for allowing a rear portion of said shoe or boot to be raised from said ski, a control lever for moving said mobile lock between a stable lock position and a stable unlocking position, an elastic system for biasing said lock in said stable lock position, wherein movement between said stable positions is performed by means of a toggle-joint system, wherein said elastic system comprises an actuating member for said mobile lock which, together with said mobile lock, constitutes said toggle-joint system, and wherein said elastic system further comprises said control lever.

4,893,831

SAFETY SKI BINDING

Roger Pascal, Annecy-Le-Vieux, and Jean P. Dimier, Rumilly, both of France, assignors to Salomon S.A., Annecy, France

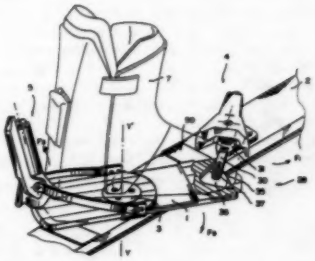
Filed Mar. 6, 1987, Ser. No. 944,230

Claims priority, application France, Jun. 20, 1983, 83 10819

The portion of the term of this patent subsequent to Jul. 14, 2004, has been disclaimed.

Int. Cl.[4] A63C *9/081*

U.S. Cl. 280—618 **25 Claims**



1. A ski binding for releasably securing a boot to a ski, said binding comprising:

(a) a pivotable plate adapted to be pivotably secured to said ski whereby said plate is pivotable on said ski around an axis substantially perpendicular to the upper surface of said ski, said plate pivoting to an unaligned position relative to said binding during release of said boot;

(b) first and second means for securing the front and rear of said boot, respectively, onto said ski, said first means being elastically pivotable to allow for release of said boot with pivoting of said first means, wherein said second means is mounted on said plate;

(c) said first means being operatively associated with said plate so that said plate and said first means together comprise means for automatic realignment of said plate in response to release of said boot, wherein said first means is operatively associated with said plate only by means of linkage means for linking said first means with said plate, and transmitting the rotational movement of said first means to said plate.

4,893,832

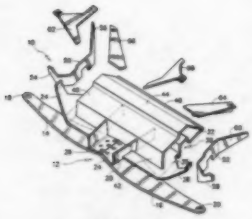
DIHEDRAL COMPOSITE VEHICLE SUSPENSION

Benjamin V. Booher, Leucadia, Calif., assignor to Suspension Group, Ltd., Encinitas, Calif.

Continuation of Ser. No. 29,100, Mar. 23, 1987, abandoned, which is a continuation-in-part of Ser. No. 835,187, Mar. 3, 1986, abandoned, which is a continuation-in-part of Ser. No. 717,791, Mar. 29, 1985, abandoned, which is a continuation of Ser. No. 525,011, Aug. 22, 1983, Pat. No. 4,509,744. This application Aug. 26, 1988, Ser. No. 237,698

Int. Cl.[4] B60G *11/02*

U.S. Cl. 280—719 5 Claims



1. A vehicle suspension assembly for supporting a body of a vehicle on laterally spaced wheel assemblies, comprising:

an elongated transverse mount structure for mounting between the side structure of a vehicle body which comprises a generally tubular box-like section having a generally horizontal bottom panel and a vertically spaced upper panel, each said bottom panel and upper panel having at least one vertical surface;

a central mount mounted on the underside of said transverse mount structure substantially on a longitudinal centerline thereof, said central mount comprising a longitudinally extending channel with an inverted V-shape; and

a combination spring and control arm assembly having a generally inverted V-configuration, secured to said central mount at said inverted V and comprising first and second arms formed of a composite material, each having a substantially uniform thickness along the length thereof extending in opposite directions from said central mount for supporting a wheel assembly at the outer end thereof for free vertical movement.

4,893,833

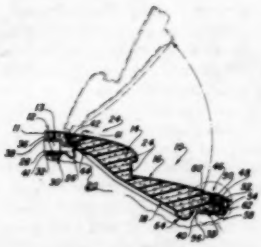
CLOSURE FOR AN AIR BAG DEPLOYMENT OPENING

Anthony J. DiSalvo, Allen Park, and David J. Bauer, West Bloomfield, both of Mich., assignors to Tip Engineering Group, Inc., Farmington Hills, Mich.

Filed Sep. 8, 1988, Ser. No. 241,893

Int. Cl.[4] B60R *21/16*

U.S. Cl. 280—732 17 Claims



1. A closure arrangement for an opening defined within an auto interior structure, said opening adapted to accommodate deployment of an inflatable safety cushion through said opening, said closure arrangement comprising:

a closure panel member configured to be interfit into said opening;

hinging means operatively associated with one side of said closure panel to enable outward pivoting of said of said closure panel away from said opening;

frangible locking means extending along another side of the said closure panel member than said side associated said hinging means, said frangible locking means normally locking said closure panel to prevent hinging open of said closure, said frangible locking means comprising interfit projecting and recess rigid portions each respectively affixed to one of said auto interior structure or said closure panel member mating together to create a lock therebetween preventing hinging opening of said closure panel by shear loading of said projecting portion, said projecting portion shearing free upon exertion of a predetermined outward pressure on said closure panel member applied by said inflatable cushion as it begins to be deployed towards said opening.

4,893,834

AUTOMOTIVE KNEE BOLSTER

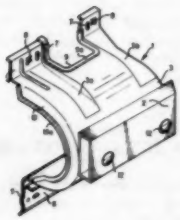
Kiyoshi Honda; Tsukasa Itoh, and Takashi Kojima, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 17, 1988, Ser. No. 207,829

Claims priority, application Japan, Jun. 18, 1987, 62-152034

Int. Cl.[4] B60R *21/04, 21/055*

U.S. Cl. 280—751 9 Claims



1. An automotive knee bolster for supporting a knee of a vehicle occupant in case of a vehicle crash, comprising:

a deformable, energy absorbing member adapted to be placed opposite to the knee of the vehicle occupant, said energy absorbing member consisting of a sheet metal member having a predetermined lateral width; and

a substantially rigid, load spreading member attached thereto to spread an impact force applied thereto by the knee to a substantial area of said energy absorbing member, said load spreading member comprising a front plate opposite to the knee of said vehicle occupant and a rear plate securely attached to the front plate by means of an upper connecting member and a lower connecting member such that said front and rear plates extend in parallel with and in a spaced relationship with each other.

4,893,835

VEHICLE SEATBELT DEFLECTION DEVICE

Scott R. Linden, 17154 Ryeland Rd., Hesperia, Calif. 92345

Continuation-in-part of Ser. No. 143,639, Jan. 12, 1988, Pat. No. 4,796,919. This application Aug. 11, 1988, Ser. No. 231,203

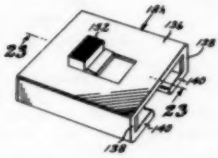
Int. Cl.[4] A47C *31/00*

U.S. Cl. 280—808 9 Claims

1. In combination with a vehicle seat belt which extends in a

substantially vertical run from an outside anchorage on one side of a vehicle seat to a door post anchorage, and which then extend in a diagonal run from the door post anchorage to a buckle means adapted for detachable connection to an inside anchorage on the other side of the vehicle seat, an improved deflection device for shortening the diagonal run and disposing it at a greater angle relative to the vertical run to suit the seatbelt to a smaller seat occupant, the deflection device comprising:

clamping means operative to fixedly clamp the diagonal run to the vertical run below the door post anchorage at a



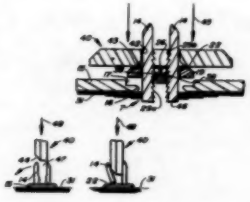
location which is selected to dispose the diagonal run at a desired angle relative to the vertical run, the clamping means including a channel shape frame having a base and overlying flanges spaced apart to define a belt entry throat; slide means in the channel movable between a first position wherein the diagonal and vertical runs are freely received through the entry throat and between the slide means and the flanges, and a second position wherein the diagonal and vertical runs are clamped between the slide means and the flanges and constrain the diagonal and vertical runs against relative movement.

4,893,836

BOOK BINDING CONNECTOR AND BINDING-DEBINDING TOOL

Charles T. Groswith, III, Los Altos; Edwin A. Seipp III, Menlo Park, both of Calif., and Thomas P. Myers, Cleveland Heights, Ohio, assignors to Taurus Holdings, Inc., Mountain View, Calif.

Filed Mar. 17, 1988, Ser. No. 169,558
Int. Cl.[4] B42B 5/08
U.S. Cl. 281—28 **16 Claims**



1. A paper sheets stack binding and debinding tool for a binding connector having headed ratchet-containing spaced posts passing through an aperture in a paper sheets stack and a headed pawl-containing locking collar, said tool comprising an essentially flat disc having a through-aperture to accommodate a pair of spaced connector posts, a finger-engageable surface and a locking collar-engageable surface for ratcheting and engaging a locking collar of a binding connector and said pair of connector posts together to hold a stack of paper sheets; and a debinding bit extending from a surface of said disc to shear an engaged pawl from said locking collar and allow separation of said pair of connector posts from said locking collar.

4. An apertured paper sheets binding connector comprising:

a binding member including a pair of elongated parallel spaced posts integrally extending from a common head, said common head having a D-shaped configuration, said posts having at least one ratcheted surface thereon, and an integral rim extending longitudinally from said common head adjacent root portions of said posts, said rim including a double-bevelled peripheral ridge adjacent an extremity of said rim;

a locking collar having a pair of matching through-apertures, an integral medial cross-bar extending between and separating said apertures, and at least one pawl hingedly mounted to said cross-bar, said through-apertures allowing sliding passage of said posts therepast and said at least one pawl to ratchet along said at least one ratcheted surface of said posts, said locking collar having a D-shaped configuration; and

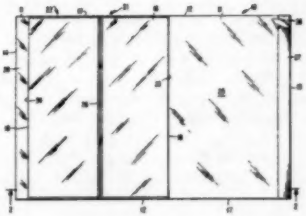
a pair of multi-apertured binding strips positionable along opposed margins of a stack of paper sheets adjacent at least two paper sheets apertures; and where each aperture of each of said strips includes a D-shaped counterbore therein, said locking collar head and said binding member common head being insertable oppositely into each of said counterbores in opposed ones of said pairs of strips to clamp a stack of paper sheets together, and where said peripheral ridge of said binding member has a diameter greater than a diameter of a strip aperture such that said binding member is click locked into said strip aperture upon insertion of said common head into a counterbore receiving said common head.

4,893,837

PROTECTIVE BOOK COVERING AND METHOD OF MAKING IT

Joseph S. Pugliese, Lewisburg, and Charles L. Garman, Jersey Shore, both of Pa., assignors to Brodart Co., Williamsport, Pa.

Filed Mar. 29, 1989, Ser. No. 330,213
Int. Cl.[4] B42D 3/00
U.S. Cl. 281—31 **9 Claims**



1. A protective book covering for a book having a front cover, a rear cover, and a spine between the rear edges of the covers, the protective book covering comprising:

a relatively long piece of sheet material having parallel longitudinal edges, and two end edges extending from one of its longitudinal edges to the other,

a relatively short piece of sheet material overlying the long piece, the short piece having two longitudinal edges in registry with and sealed to the two longitudinal edges, respectively, of the long piece, and the short piece having two end edges extending from one of its longitudinal edges to the other, and

a seal and tear line extending from one to the other of the longitudinal edges of both pieces and being located between and spaced from the transverse edges of the short piece, the seal and tear line serving to seal together the two pieces and form a line of severance along which the pieces can be torn to produce two units, each unit having a pocket adjacent to the seal and tear line for accommodating one of the book covers and at least one of the units having a section, extending from the pocket of that unit,

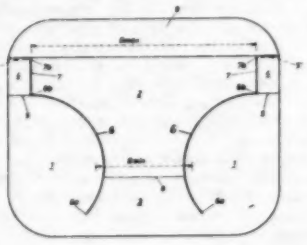
long enough to wrap around the spine of the book when a book cover is in place within that pocket.

4,893,838

HOLDING DEVICE FOR PRINTED MATTER

Irmfried Wöber, No. 1018, A-3042, Würmla, Austria

Filed Jun. 21, 1988, Ser. No. 209,501
Claims priority, application Austria, Jul. 9, 1987, 1733/87
Int. Cl.[4] B42D *3/08, 17/00;* **B42F** *15/00;* **B65D** *27/00*
U.S. Cl. 281—45 **4 Claims**



1. A holding device for printed and paper goods, comprising a blank sheet of transparent material having two sides, a top and a bottom and a front and back wall, which sheet is subdivided into a first and second panel by two semicircular cuts, each cut beginning at a distance from the bottom of said sheet and continuing toward the top of said sheet in a semicircle, said semicircle forming at least a quarter circle, but less than a half circle, with each of the upper ends of said semicircular cuts terminating in a straight cut further extending toward the top of said sheet and terminating at a distance short of the top of said sheet, so that said first panel comprises a first web along the bottom of said sheet with sides delinated by said semicircular and straight cuts and a second web along the top of said sheet, with a first and second fold line extending between said straight cut and the side of said sheet, and so that said second panel comprises that portion of sheet material delineated by the semicircular and straight cuts with a third fold line extending between said semicircular cuts, which is placed between the lower ends of said semicircular cuts and that part of said semicircular cuts corresponding to at least a quarter circle.

4,893,839

MOVABLE INDEX SHEET UNIT

George O. Podd; Robert J. Mangler, both of Chicago, and Anne J. Marsland, Schaumburg, all of Ill., assignors to Wilson Jones Company, Chicago, Ill.

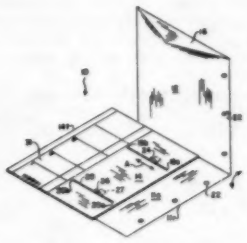
Filed Nov. 17, 1988, Ser. No. 272,368
Int. Cl.[4] B42D *15/00*
U.S. Cl. 283—65 **4 Claims**

1. A movable index sheet unit comprising

a base sheet having a forward and a rear edge such base sheet having a first and second spaced-apart track follower means;

a movable index sheet with forward and rear edges having slot track means to permit reciprocation of the index sheet guided by the track follower means within limits from an exposed position for complete index viewing in which the forward index sheet edge is remote from the forward base sheet edge to a retracted position;

the track follower means including tab means formed from and extending from the base sheet through the



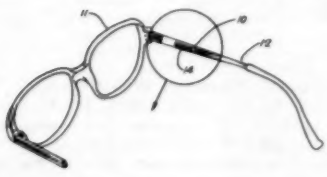
track slot means and bent to be oriented in a plane substantially parallel to the base sheet.

4,893,840

ARTICLE IDENTIFICATION LABEL AND METHOD OF ARTICLE IDENTIFICATION

William E. Berkowitz, 4931 Birchwood, Skokie, Ill. 60077

Filed Apr. 15, 1988, Ser. No. 181,941
Int. Cl.[4] B42D *15/00;* **G09F** *3/00;* **G02C** *1/00;* **B05D** *3/06*
U.S. Cl. 283—81 **5 Claims**



1. An identification label for eyeglasses having a frame comprising:

identifier means mounted on a surface of the frame of the eyeglasses, said identifier means being visible to the naked eye;

a hard transparent coating means for protecting the identifier means from being separated from the surface of the eyeglasses, said coating means substantially covering the identifier means and being formed when a hardenable liquid is applied to the identifier means so as to substantially cover the identifier means and is allowed to harden to form a transparent coating capable of withstanding wear from prolonged usage of the eyeglasses.

4,893,841

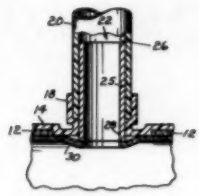
REAMER GUIDE FOR PRIMARY SEWER LINE TAPS

William D. Bowen, 123 S. W. 87, Oklahoma City, Okla. 73139

Filed Apr. 20, 1989, Ser. No. 340,836
Int. Cl.[4] F16L *55/18*
U.S. Cl. 285—15 **2 Claims**

1. In a subterranean liquid and waste primary drain line having a cylindrical bore and having a tee interposed in the line and cooperatively forming a continuation of the cylindrical bore with the lateral opening of the tee connected in communicating relation with the discharge end portion of a lateral secondary drain line and having the surface defining its cylindrical bore imperviously sealed by a the wall of a plastic material tube, the improvement comprising:

a sleeve contained by the lateral line in its end portion connected with the tee,



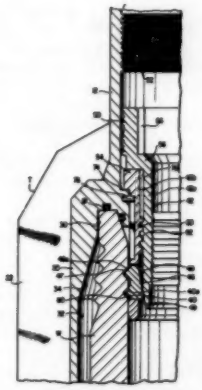
said sleeve having one of its end surfaces abutting and closed by the wall of the liner tube.

4,893,842

WELLHEAD TIEBACK SYSTEM WITH LOCKING DOGS

Norman Brammer, Scotland, United Kingdom, assignor to Vetco Gray Inc., Houston, Tex.

Filed Sep. 27, 1988, Ser. No. 250,022
Int. Cl.[4] F16L *35/00*
U.S. Cl. 285—24 5 Claims



1. In a conductor tieback connector for connecting a conductor to a subsea wellhead of the type having a tubular body sealably and rigidly connectible to the conductor, a downwardly opening funnel means connected to the tubular body for aligning the connector, and upward and downward facing abutting surfaces on the wellhead and the tubular body, respectively, for abutting when the tubular body is fully engaged within the wellhead, an improved lockdown means for locking the connector to the wellhead, comprising in combination:

at least one internal circumferential groove formed in the wellhead, the groove having a load shoulder that inclines downward and inward relative to a longitudinal axis of the wellhead;

an inner ring;

an outer ring;

means for carrying the inner ring within the outer ring;

means for carrying the rings in the tubular body;

a locking element;

a means for carrying the locking element with the outer ring for radial movement relative to the outer ring and for preventing any axial movement of the locking element relative to the outer ring, the locking element having an inner surface and a load shoulder that inclines upward and outward relative to a longitudinal axis of the outer ring for engaging the load shoulder of the groove;

the inner ring having an outer surface that is positioned for engaging an inner surface of the locking element;

an upward facing ledge formed internally within the tubular body;

a collar on the exterior of the outer ring for bearing against the ledge;

means in the inner ring for receiving a running tool for moving the inner ring downward relative to the outer ring and the tubular body, causing the inner ring outer surface to slide on the locking element inner surface to force the locking element outward into the groove; and

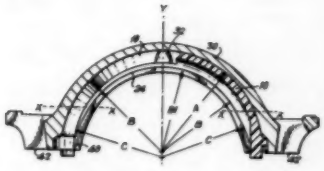
the distance between the locking element load shoulder and the collar being slightly less than the distance between the ledge and the groove load shoulder when the abutting surfaces of the wellhead and tubular body engage each other, so as to cause an interfering engagement of the load shoulders, exerting a preload force on the abutting surfaces as the locking element load shoulder slides outward against the groove load shoulder.

4,893,843

LUBRICANT-FREE ELASTOMERIC GASKET

Peter G. DeRaymond, Nazareth, Pa., assignor to Victaulic Company of America, Easton, Pa.

Filed Mar. 13, 1989, Ser. No. 322,789
Int. Cl.[4] F16L *21/06*
U.S. Cl. 285—112 21 Claims



1. In an elastomeric gasket for incorporation into a segmented pipe coupling comprised of arcuate coupling segments, said elastomeric gasket being of an arcuate length greater than the arcuate length of a said arcuate coupling segment and having at least one sealing lip extending in a generally axially direction on a radially inner surface thereof, the improvement comprising:

a first portion of said sealing lip of a first radius intermediate the ends of said gasket; and,

second portions of said sealing lip extending between the ends of said first portion and the respective ends of said gasket, each said second portion being of a radius greater than said first portion, and, at least equal in radius to the external radius of a pipe for which the segmented pipe coupling is intended;

whereby said elastomeric gasket can be positioned over a said intended pipe in the substantial absence of frictional engagement with said pipe.

4,893,844

TUBULAR COUPLING WITH VENTABLE SEAL

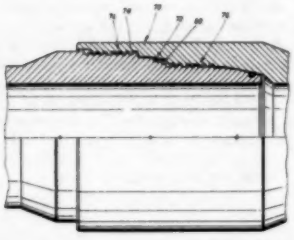
K. Darrel Chelette, Katy, and Charles A. Bellfrass, Houston, both of Tex., assignors to Baker Hughes Incorporated, Houston, Tex.

Continuation of Ser. No. 489,752, Apr. 29, 1983, abandoned.
This application Aug. 28, 1985, Ser. No. 771,137
Int. Cl.[4] F16L *15/04*
U.S. Cl. 285—113 2 Claims

1. A threaded coupling that resists thread separation of two mating tubular members, comprising:

an internally hook threaded box on one tubular member;

an externally hook threaded pin on the other tubular member engaging the threaded box to resist jump out;
a stop shoulder between the two members;
a first seal surface on the box;
a second seal surface on the pin to form a metal-to-metal seal of selected interference with the first seal surface of the box;
a seal groove in one of the tubular members between the metal-to-metal seal and the end of the pin;



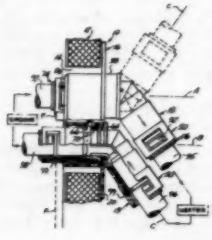
a gap between the seal groove and the end of the pin; and
seal means seated in said seal groove with an interference in the range of substantially six to ten times the interference of the metal-to-metal seal wherein pressure build-up between the threads is vented into said tubular members and fluid flow from within said tubular members is isolated from the threads.

4,893,845

FIREWALL HEATER LINE ADAPTER

Donald D. Bartholomew, Marine City, Mich., assignor to Proprietary Technology, Inc., Mt. Clemens, Mich.

Filed Apr. 18, 1988, Ser. No. 183,640
Int. Cl.[4] F16L *5/00, 37/00*
U.S. Cl. 285—137.1 **8 Claims**



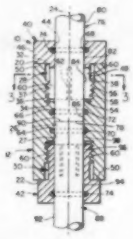
1. A flowthrough connector assembly for passing a high heat fluid between first and second reservoirs separated by a wall having an opening therein, comprising in combination an adapter body mountable on said wall and including at least two tubular conduits each defining a central passageway and extending into the opening, a pair of angled elbows each having a first and a second end portion, each elbow being adapted to have its first end portion removably mounted in a respective conduit such that its second end portion is spaced from the adapter and positionable angularly for desired mating, the elbows being independently angularly positionable relative to one another, and retainer means in each said elbow for retaining a fluid conduit in a swivelable sealed connection therewith, each said elbow and fluid conduit being swivelable independently of one another.

4,893,846

CONNECTOR FITTINGS

Doonan D. McGraw, 245 Saint James Way, Naples, Fla. 33942-6715

Filed May 2, 1989, Ser. No. 346,473
Int. Cl.[4] F16L *21/06*
U.S. Cl. 285—156 **24 Claims**



1. A fitting of the spring cantilever clamp action type having spring cantilever clamping legs and a plurality of normally engaged camming surfaces, said spring cantilever clamping legs being resiliently moved to the cantilever clamping position from an unclamped normal position by the cooperative camming action of said plurality of engaged camming surfaces acting in one direction and by cantilever spring action returning to the unclamped normal position when the cooperative camming action of said camming surfaces acting in said one direction is reversed, said camming surfaces being positioned obliquely relative to said clamping legs and also obliquely relative to the direction of resilient movement of said clamping legs to and from the clamping position;
said fitting being constructed and arranged to have said camming surfaces internally contained so as to be protected against accidental impact damage during normal handling, transport, the process of attachment to at least one cylindrical member, and in its installed position;
said fitting comprising:
a nut defining a fitting main body and having a plurality of ends, said nut further having a bore therein defining at one bore end an enlarged recess opening outwardly of said bore through one of said nut ends, said recess being provided with a first one of said camming surfaces defined by an internal thread in axially inwardly spaced relation to the outward opening of said recess;
a cap bolt having a bore therethrough, a bolt head, a longitudinally segmented annular bolt shank extending axially from said bolt head and provided with a second one of said camming surfaces defined by an interrupted external thread at the remote end of said segmented annular bolt shank from said bolt head, said second camming surface being in axially spaced relation to said bolt head so that said segmented annular bolt shank is fully received in said nut recess when said cap bolt is threaded into said nut until said bolt head engages said nut one end at said recess outer opening to prevent further movement of said bolt head axially toward said recess and to fully contain said internal and said external thread camming surfaces protectively within said recess, said segmented annular bolt shank comprising shank segments defining said spring cantilever clamping legs;
and means sealing said cap bolt bore in the area of said cap bolt head and also sealing said nut recess axially beyond said internal camming surface thread;
said internal and external camming threads cooperating in camming relation to move said shank segment clamping legs in cantilever fashion inwardly when said cap bolt is rotated in a further inwardly threading direction, said shank segment clamping legs then being adapted to clamp-

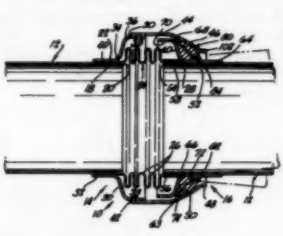
ingly grip a member received in said bore in the axial area of said external thread camming surface.

4,893,847

BEARING SEAL FOR UNIVERSAL BALL JOINT

Robert A. Hess, Altadena, Calif., assignor to Stainless Steel Products, Inc., Burbank, Calif.

Filed Jul. 5, 1988, Ser. No. 214,944
Int. Cl.[4] F16L *27/04*
U.S. Cl. 285—226 5 Claims



1. In a universal ball joint, for an annular bleed high temperature air ducting which includes at least two pieces each having a plane with said universal ball joint interposed between said pieces of ducting, said universal ball joint capable of angulation to change the direction of said pieces of ducting, said universal ball joint having an annular first half secured to one of said pieces of said ducting, and an annular second half secured to the other of said pieces of said ducting an annular bellows within said ball joint between and uniting each of said pieces of ducting one with the other, said first half of said ball joint having a race portion overlying said bellows and a portion of said second half, said second half of said ball joint having a retainer portion underlying said race creating a bearing seal space therebetween, and said race portion movable with respect to said retainer portion when either of said halves angulate with respect to each other, the improvement comprising:

an annular non-deflecting bearing seal adapted to be interfitted within said bearing seal space to act as a bearing and seal upon which said race rides with a low coefficient of friction, said bearing seal includes a non-layered graphite composition multifaced band, and a reinforcing core of a different material than said graphite composition;

said retainer portion of said second half of said ball joint having two faces at angles one to the other and two faces of said multifaced band correspond to the angular relationship of said two faces of said retainer whereby said bearing seal is seated thereagainst in a fixed position; and

said race portion of said first half of said ball joint includes a seal bearing face above said retainer portion of a different angle than either of said two faces of said retainer and said bearing includes another of its multifaces corresponding to the angle of said bearing face.

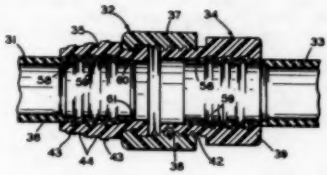
4,893,848

HOSE COUPLING

Edward L. Melcher, Grosse Pointe Park, Mich., assignor to Wiaeler Stamping Company, Montpelier, Ohio

Filed Nov. 8, 1988, Ser. No. 268,452
Int. Cl.[4] F16L *33/20*
U.S. Cl. 285—258 11 Claims

1. In a coupling member for hoses, a flexible coupling section having a central bore of a diameter substantially equal to the outside diameter of said hose and adapted to fit over the end segment of said hose, said coupling section including a threaded portion for coupling said member to a mating coupling section, said bore being defined by an interior cylindrical wall within said coupling member, a series of annular barbs formed in said cylindrical wall and defining spaced apexes separated by recessed areas, said annular barbs having a reverse rake angle, each said barb comprising a base sloping rearwardly and outwardly to a juncture with a radial wall extending inwardly and forwardly therefrom, said juncture defining a said apex, said apexes being longitudinally aligned along lines parallel to the longitudinal axis of said central bore,



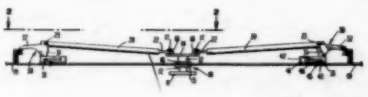
and a tubular ferrule within the interior of said end segment urging the wall of said hose section outwardly into said barbs, said tubular ferrule including a central passageway having a cross-sectional area substantially equivalent to the interior passage of said hose, and an annular rib projecting toward a said recessed area between apexes of said barbs.

4,893,849

REMOTE LATCHING MECHANISM

Richard E. Schlack, Unionville, Pa., assignor to Southco, Inc., Concordville, Pa.

Filed Sep. 24, 1987, Ser. No. 100,623
Int. Cl.[4] E05C *5/02*
U.S. Cl. 292—7 20 Claims



1. A remote latching mechanism comprising:

(a) an actuator assembly;

(b) at least one elongate rod affixed to said actuator assembly for lateral movement in response to actuation of said assembly;

(c) a bracket; and

(d) a pawl connected to said rod at a location remote from said actuator assembly and disposed within said bracket for sliding and pivoting movement in response to the lateral movement of said rod; wherein said bracket comprises a pair of opposing side walls and a back wall connected to said side walls, wherein said pair of side walls is each provided with a longitudinal slot therein and a flange connected thereto, said flanges comprising means for mounting said bracket to a closure member, and wherein said slots comprise means for facilitating the guiding and pivoting of said pawl.

4,893,850

OPENING/CLOSING DEVICE

Akira Mizusawa, Utsunomiya, Japan, assignor to Nifco, Inc., Yokohama, Japan

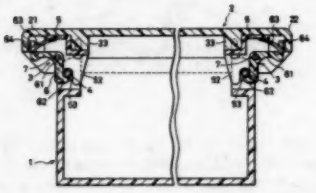
Filed Nov. 17, 1988, Ser. No. 272,369
Claims priority, application Japan, Nov. 30, 1987, 62-180969[U]
Int. Cl.[4] E05C *19/12*
U.S. Cl. 292—128 20 Claims

1. An opening/closing device for detachably coupling an end portion of a closure member to an end portion of a body having an opening to be opened and closed by said closure member, comprising:

a locking shaft fixedly mounted upon said body within the vicinity of said end portion of said body;

notch means defined within said closure member for engaging a first portion of said locking shaft of said body when said closure member is disposed at its closed position upon said body;

an operating lever, including pawl means formed upon one end thereof, pivotably mounted upon said closure for movement member between a first position at which said pawl means is engaged with a second portion of said locking shaft so as to cooperate with said notch means for



retaining said closure member at said closed position upon said body, and a second position at which said pawl means is disengaged from said locking shaft so as to permit said closure member to be moved from said closed position to an open position; and

spring means operatively connected to said operating lever and engaged with an inner undersurface portion of said closure member for biasing said operating lever and said pawl means thereof toward said first position at which said pawl means is engaged with said second portion of said locking shaft so as to retain said closure member at said closed position upon said body.

4,893,851

THUMB TURN LATCH

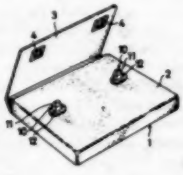
Ryukichi Murai, Toyama, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan

Filed Sep. 30, 1988, Ser. No. 251,357

Claims priority, application Japan, Oct. 1, 1987, 62-159020[U]

Int. Cl.[4] E05C 5/02

U.S. Cl. 292—204 **7 Claims**



1. A thumb turn latch comprising:

(a) a latch body having a grip head and a split shank extending perpendicularly from a lower surface of said grip head and terminating in an enlarged foot, said grip head having on said lower surface at least one locking ridge extending radially relative to a central axis of said split shank; and

(b) a retainer movably holding thereon said latch body and including a bearing portion slidably receiving therein said split shank of said shank body, said bearing portion having a stepped hole including a small-diameter portion extending downwardly from an upper surface of said bearing portion and a large-diameter portion contiguous to said small-diameter portion and receiving therein said enlarged foot of said split shank, said large-diameter portion having an upwardly tapering cam surface disposed adjacent to said small-diameter portion and engageable with said enlarged foot to urge said latch body downwardly toward said retainer, said bearing portion further having in said upper surface a crisscross guide groove extending radially outwardly from said stepped hole for receiving therein said locking ridge to lock said latch body in position against rotation relative to said retainer.

4,893,852

DUAL SENSOR ELECTROMAGNETIC DOOR LOCK SYSTEM

Daniel J. Harris, West Hartford, and Richard W. Gladych, Burlington, both of Conn., assignors to Harrow Products, Inc., Grand Rapids, Mich.

Filed Jan. 17, 1989, Ser. No. 297,700

Int. Cl.[4] E05C 17/56

U.S. Cl. 292—251.5 **13 Claims**

1. An electromagnetic lock system adaptable for providing controlled access through a doorway having a frame mounting a door with an armature comprising:

housing means mountable to the door frame;

electromagnetic lock means mounted to said housing means and selectively electrically energizeable for magnetically bonding with the armature to provide a locked state;

ultrasonic sensor means mounted in said housing means for generating an ultrasonic detection beam traversing a path remote from said housing and for receiving reflected echoes from said beam;

passive infrared sensor means mounted in said housing means for sensing radiant energy temperature changes from a detection zone remote from said housing means;

processing means mounted in said housing means for processing said received reflected echoes to detect the presence of a foreign object in said beam and for processing said sensed radiant energy to detect the movement of a foreign object into the detection zone; and

lock release means responsive to said processing means for automatically transforming said electromagnetic lock means to a non-locked state for a pre-established time interval upon detection of a foreign object in said beam and movement of the object into said detection zone.

4,893,853

PADLOCK-TYPE SECURITY SEAL

Richard S. Guller, Newton, N.J., assignor to E. J. Brooks Company, Newark, N.J.

Filed Jan. 24, 1989, Ser. No. 300,895

Int. Cl.[4] E05B 39/02

U.S. Cl. 292—320 **10 Claims**

1. A security seal comprising:

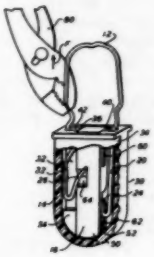
a shackle having at least one leg with a resilient locking element thereon;

a seal body having a chamber therein and an opening in one side thereof contiguous with said chamber;

a locking insert mounted in said seal body;

said insert having a slot in at least one wall thereof with an opening contiguous with said chamber; and

means in said slot for engaging said locking element and retaining said shackle leg in said chamber and for forcing



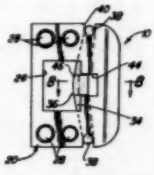
said element against a predetermined portion of said body when a sufficient force is applied to said shackle.

4,893,854

SELF-ADJUSTING DOOR STRIKE

Hagen Dietrich, Delta, Canada, assignor to Masco Building Products Corp., Taylor, Mich.

Continuation of Ser. No. 9,434, Feb. 2, 1987, Pat. No. 4,813,724.
This application Aug. 23, 1988, Ser. No. 235,247
The portion of the term of this patent subsequent to Mar. 21, 2006, has been disclaimed.
Int. Cl.[4] E05B *15/02*
U.S. Cl. 292—341.12 7 Claims



1. A door strike for receiving an elongated latch bolt of a door lock mechanism longitudinally movable between an extended and a retracted position, said door strike comprising:

a plate member having rear and front faces and a plurality of apertures for mounting said plate member to the frame of the door in alignment with the door lock mechanism, said plate member having a central opening having a configuration of the latch bolt, said bolt longitudinally extendable through said central opening; and

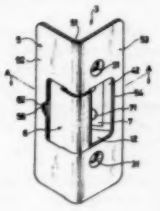
a resilient biasing member attached to said rear face of said plate member, said biasing member including an elongated arm having opposite ends slidably attached to said plate member and an intermediate apex extending across said central opening of said plate member to engage the latch bolt upon longitudinal extension thereof, said arm biasingly engaging the latch bolt upon extension of the bolt through said central opening, said biasing member positionally captured between said plate member and the door frame wherein said plate member includes a camming lip integrally formed therewith and extending forwardly beyond the edge of he door frame for preliminarily engaging the latch bolt.

4,893,855

CATCH UNIT FOR A LATCH DEVICE

Ryoichi Itakura, Tokyo, assignor to Janco Corporation, Tokyo, Japan

Filed Nov. 7, 1988, Ser. No. 267,953
Claims priority, application Japan, May 27, 1988, 63-69250[U]
Int. Cl.[4] E05B *15/02*
U.S. Cl. 292—341.17 3 Claims



1. A catch unit for a latch device, comprising:

a catch body formed by bending a metallic plate in an L-shaped cross section, having a front leg and a side leg meeting each other along an edge, and provided with an opening for receiving a latch member therein, and upper and lower projections projecting respectively from the upper and lower sides of the opening on the extension of the edge;

a base plate attached along the opposite side edges to the backside of the catch body so as to form a predetermined space behind the opening of the catch body;

a plate spring provided within the space and fixed to the base plate; and

a catch door having one end pivotally joined to the plate spring with a hinge pin, and the other end provided with a detaining part which engages the projections of the catch body;

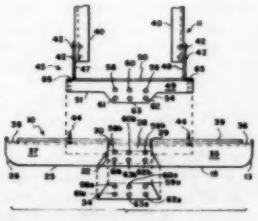
characterized in that the catch door closes a portion of the opening of the catch body when attached to the catch body with the detaining part thereof in engagement with the projections of the catch body, and the plate spring urges the hinge pin constantly away from the projections of the catch body to hold the catch door closed.

4,893,856

COMBINED TRAILER HITCH AND STORAGE BUMPER

Jackie L. Council, 5801 Greenway Ave., Newport News, Va. 23605

Filed Feb. 21, 1989, Ser. No. 313,442
Int. Cl.[4] B60R *19/02, 19/24*
U.S. Cl. 293—106 18 Claims



15. A combined trailer hitch/storage bumper for pickup trucks, vans or like vehicles, comprising in combination:

(A) a first structure comprising a bracket support for a vehicle bumper and including

(1) a pair of elongated metal segments each having a first and a second end, and a plurality of spaced openings provided along a portion of their length at said first end thereof;

(2) a transverse elongated mounting bracket having a vertical and a horizontal flat side, said vertical side of said transverse elongated mounting bracket being welded to said second end of each of said elongated metal segments at an area spaced from the ends of said transverse mounting bracket and serving to maintain said pair of elongated metal segments in spaced parallel relationship;

(3) a horizontal flat plate member having a first side disposed substantially intermediate the length of said horizontal flat side of said transverse mounting bracket, a pair of sides tapering and extending from said first side of said horizontal flat plate member to a second side parallel with and of reduced length relative to said first side of said horizontal flat plate;

(4) a pair of spaced openings provided through said vertical flat side of said transverse mounting bracket; and

(5) a plurality of openings provided in said horizontal flat plate member;

(B) a second structure comprising a vehicle bumper and adapted to be attached to said first structure and including

(1) a vehicle bumper having a storage compartment at each end thereof and provided with a central connecting area for said storage compartments;

(2) a single piece metal member forming the central connecting area as well as the front and ends of said storage compartments;

(3) said single piece metal member having a first curved area and forming an end of one storage compartment; a first flat area extending from said first curved end and forming the front of said one storage compartment; an angular segment extending from said first flat area and forming the major portion of the other end of said one storage compartment; a second flat area extending from said angular segment and forming a portion of the central connecting area between the two storage compartments; a second angular segment leading from said second flat area and forming the major portion of an end of the other of said storage compartments; a third flat area in the same plane and having the same dimensions as said first flat area and extending from said second angular segment and forming the front of said other storage compartments; and a second curved area extending from said third flat area and forming an end of said other storage compartment;

(4) a bottom plate member conforming in shape to the curved ends and having an edge extending the length of said single piece metal member, said bottom plate member being parallel with said first and third flat areas of said said single piece metal member and being attached to said single piece metal member to serve as the bottom surface of each said compartment;

(5) a flat plate extension of said bottom plate member disposed perpendicular thereto and serving as the back of each of said compartments; each said compartment back being provided with at least one through opening therein and in alignment with said pair of through openings provided in the vertical side of said transverse mounting bracket;

(6) a rain drain channel member attached to and extending in back of each said compartment and;

(7) a closure top for each said compartment, each said closure top being hingedly connected along one side thereof to said flat plate extension member serving as the back of said compartments, each said closure top having an overlaying lip surface on all sides thereof;

(8) sealing means disposed about the interior periphery of each said closure top to provide a watertight seal for each said compartment when said closure tops are in closed position; and

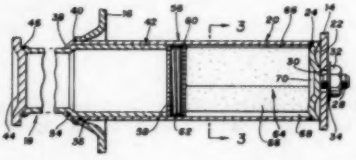
(C) means for connecting said first structure to the frame of a vehicle and for connecting said second structure to said first structure.

4,893,857

TELESCOPIC ENERGY ABSORBER UNIT FOR VEHICLE BUMPER MOUNTING

David A. Bobinger, Middletown; Abayomi O. Folarin, and James H. Childress, both of Dayton, all of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Sep. 6, 1988, Ser. No. 240,291
Int. Cl.[4] B60R *19/30, 19/28*
U.S. Cl. 293—136 7 Claims



1. An energy absorbing unit for mounting a bumper assembly at a predetermined and pre-impact position relative to an automobile comprising:

(a) a support cylinder defining a chamber;

(b) an energy absorbing medium of resilient elastomeric material operatively mounted in said chamber said energy absorbing medium including a plurality of longitudinal side walls parallel to the longitudinal axis of said energy absorbing medium, and only some of said side walls being in full-time engagement with an inner wall of said support cylinder;

(c) compressed, resilient preload piston means operatively mounted in said chamber for full-time engagement therewith and operatively associated at a first end with said energy absorbing medium;

(d) a piston tube having an inner end engaging a second end of said preload piston means and extending from said support cylinder to an outer end for operative connection with the bumper assembly;

whereby an impact load applied to said bumper assembly will cause the deflection of said preload piston means and the subsequent deflection of said energy absorber medium so that said impact load is stored, said energy absorbing medium and said preload piston means providing a force of restitution to move said piston tube outwardly and said bumper assembly to said pre-impact position subsequent to removal of said impact load.

4,893,858

MOVABLE YOKE-TYPE LIFTING MAGNET DEVICE

Naoyuki Yoshitani; Mitsunori Minamisawa, and Tomomi Kishi, all of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

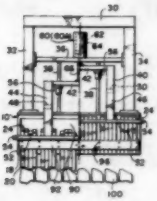
Filed Jun. 24, 1988, Ser. No. 210,931
Claims priority, application Japan, Jun. 26, 1987, 62-97361[U]
Int. Cl.[4] B66C *1/06*
U.S. Cl. 294—65.5 17 Claims

1. A movable yoke-type lifting magnetic device comprising:

a magnetic core having first and second ends and adapted to be selectively magnetically excited;

at least one yoke provided at each of said first and second ends of said core, respectively, each said yoke having a lower end adapted to magnetically couple with a workpiece to be lifted, and each said yoke being configured to be slidable relative to said core in a vertical direction when said core is not magnetically excited and to be magnetically coupled to said core when said core is magnetically excited;

a movable framework supported so as to be movable relative to said core in the vertical direction, said movable framework including means for engaging with each said yoke to lift each said yoke when said movable framework is moved upwards, and for releasing each said yoke so as to



allow each said yoke to move downwards by its own weight when said movable framework is moved downwards; and

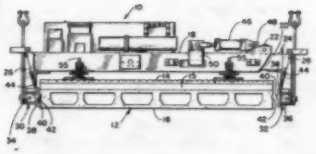
drive means, mounted to connect said core and said movable framework, for lifting and lowering said movable framework in the vertical direction relative to said core.

4,893,859

CONCRETE SLAB LIFTING CLAMP

Richard C. Nash, New Prague, Minn., assignor to Fabcon, Inc., Savage, Minn.

Filed Aug. 3, 1988, Ser. No. 227,768
Int. Cl.[4] B66C 1/42
U.S. Cl. 294—103.1 **6 Claims**



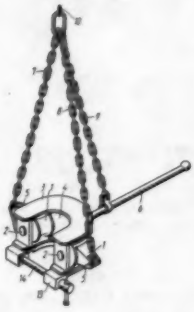
1. In an apparatus for lifting concrete panels, said apparatus including two or more lifting clamps, each of which comprises: a first beam; a second beam; a first clamping head connected to said first beam; said first clamping head constructed and arranged to engage said panel on one sidewall thereof; a second clamping head connected to said second beam, said second clamping head constructed and arranged to engage said panel on an opposite sidewall thereof; means for moving said first beam relative to said second beam to selectively engage and disengage one or both of said clamping heads from the sidewall of said panel; and connection means connected to said apparatus and constructed and arranged for connection to a lifting cable, said connection means providing for pivotal movement of said apparatus and said first and second clamping heads about an axis through said panel below said beams, the improvement comprising: each of said clamping heads including diamond crystals bonded to a panel engaging face of said clamping head wherein said diamond crystals are bonded to said clamping head by a braze alloy in a monolayer of crystals positioned at diverse points on said clamping head faces so as to distribute the points at which a load may be applied to said clamping heads.

4,893,860

DEVICE FOR GRIPPING AND SUSPENDING DRILL PIPE STAND

Nariman G. K. O. Kurbanov; Vagif A. Ali-Zade; Vladimir A. Kartashev, and Eldar T. O. Zeinalov, all of Baku, U.S.S.R., assignors to Azerbaidjansky Nauchno-Issledovatelsky I Proektno-Konstruktorsky Institut Neftyanogo Mashino-Stroeniya, Baku, U.S.S.R.

Filed Jun. 30, 1988, Ser. No. 213,625
Int. Cl.[4] B66C 1/44
U.S. Cl. 294—114 **3 Claims**



1. A Device for gripping an elongated article such as a drill pipe stand, the device comprising a yoke-shaped housing having opposed, substantially parallel arm portions each extending from a base portion of the housing, the arm portions defining a passageway therebetween for embracing the article, an eccentric gripper pivotally mounted in each arm portion about a respective pivot axis, a lever connected with each gripper for moving the gripper between a gripping position and a release position with respect to the passageway, the lever extending outwardly from the respective arm portion, a lifting member, a flexible element extending between each lever and the lifting member for suspending the housing from the lifting member with the arm portions and the pivot axes extending substantially horizontally, an elongate operating handle extending outwardly from the base portion of the housing, and a flexible member extending between the lifting member and a part of the handle located between the housing and an outer end of the handle, the device being configured for tensioning the flexible member while relaxing the flexible elements when downward pressure is applied to the outer end of the handle and for relaxing the flexible member while tensioning the flexible elements when said pressure is released, and each gripper being configured for assuming the release position when the respective flexible element is relaxed and the gripping position when the respective flexible element is tensioned.

4,893,861

DRUM LIFTER RING

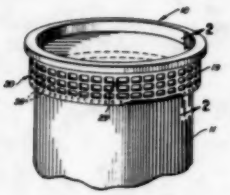
Michael D. Stoltzman, Lake Forest, Ill., assignor to International Precision Components Corporation, Lake Forest, Ill.

Filed May 23, 1988, Ser. No. 197,644
Int. Cl.[4] B65D 25/22; B66C 1/18
U.S. Cl. 294—119.2 **15 Claims**

1. A drum lifter ring for use in lifting a drum by means of an upwardly directed lifting hook, the drum having a top wall and a sidewall provided with an annular, outwardly opening groove spaced below the top wall, said lifter ring comprising

a one-piece ring of moulded synthetic resin having an annular thin-walled midportion defining a radially outer surface, a radially inner surface, and a plurality of recesses spaced circumferentially therein, and opening radially outwardly through said outer surface, an annular rigid top wall having a radially outer portion projecting outwardly

beyond said midportion outer surface and defining a downwardly opening annular recess for receiving an upwardly extending lifting hook, and an annular rigid bottom wall having a radially inner portion projecting inwardly beyond said radially inner surface of the midportion to be fixedly received in an annular groove of a drum to which the lifter ring is to be mounted, a radially outer portion, and at least one downwardly opening recess in said bottom wall disposed between said radially inner portion and said radially outer portion.



4,893,862

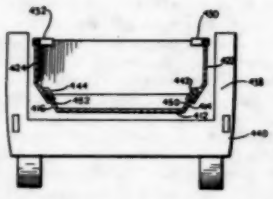
REMOVABLE CARGO BED LINER

Robert A. Hollenbaugh, Sr., Erie, Pa., assignor to R & R Enterprises, Erie, Pa.

Continuation of Ser. No. 60,639, Jun. 11, 1987, abandoned. This application Nov. 21, 1988, Ser. No. 274,393

Int. Cl.[4] B62D *25/00*

U.S. Cl. 296—39.1 1 Claim



1. A cargo area liner for a vehicle comprising a bottom panel, a first side panel, a second side panel, a first end panel, a second end panel, the bottom panel having a first side flange, a second side flange, a first end flange and a second end flange at a first side, a second side, a first end and a second end thereof respectively,

said end flanges and said side flanges of said bottom panel being integrally attached to said bottom panel and extending upwardly and outwardly therefrom,

said first end panel having a first part and a second part,

said second end panel having a first part and a second part,

said first side panel having a first part and a second part,

said second side panel having a first part and a second part,

said first part of said first side panel and said first part of said second side panel and said first part of said first end panel and said first part of said second end panel extending upwardly and outwardly and integrally attached to said second parts of said side panels and said end panels respectively,

first means supporting said first part of said first end panel on said second side flange,

second means supporting said first part of said second end panel on said first side flange,

third means supporting said first part of said first side panel on said first end flange and fourth means supporting said first part of said second side panel on said second end flange respectively,

said first side panel and said second side panel each having a first end and a second end,

said first end panel and said second end panel each having a first end and a second end engaging said first ends and said second ends of said end panels at a first angular corner, a second angular corner, a third angular corner and a fourth angular corner,

angular corner members,

said angular corner members, being U-shaped in cross section, and receiving the upper ends of said second parts of said panels at said corners holding said side panels and said end panels in end-to-end relation to each other,

whereby said bottom panel, said side panels and said end panels provide a cargo area liner for a vehicle.

4,893,863

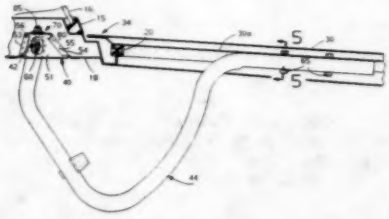
ADJUSTABLE DECK LID HINGE PIVOT

Raymond S. Skonieczny, Warren; Douglas A. Ford, Rochester Hills, and Robert W. Pryor, Mt. Clemens, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Feb. 6, 1989, Ser. No. 306,719

Int. Cl.[4] B62D *25/10*

U.S. Cl. 296—76 3 Claims

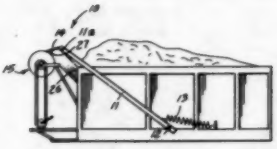


1. In an automotive vehicle having body structure including spaced side quarter panels and spaced supports extending transversely to said quarter panels which together define a compartment having a top opening, a closure, a pair of spaced hinge assemblies for swingably supporting said closure for movement between an open position to permit access to said compartment and a closed position in which said closure covers said compartment, each of said hinge assemblies comprising a hinge box having spaced vertical sides and top and with the hinge box being mounted to one of said transverse supports, a generally horizontal pivot means extending through aligned openings in the sides of said hinge box, a hinge strap having one end mounted to said closure and another end pivotally connected to said pivot means, and adjustment means for vertically raising and lowering the pivot means and hence the closure so that an exterior surface thereof will be flush with adjacent exterior body structure of the vehicle, the improvement being that the adjustment means for raising and lowering said closure comprises providing vertically extending slots in the sides of said hinge box and providing an eye bolt and nut for raising and lowering said pivot means, said eye bolt at one end being pivotally connected to said pivot means and being threaded at another other end and extending through an opening in the top of said hinge box, said nut being threadably engaged with said threaded end of said eye bolt and engageable with the top of said hinge box, said nut being rotatable to cause said eye bolt and pivot means to be moved vertically within the slots in the sides of the hinge box so that the closure can be raised and lowered at an end thereof adjacent the hinge box to enable the closure to be vertically adjusted so that exterior sides thereof will be flush with the adjacent vehicle body structure.

4,893,864
EXTENSIBLE AND RETRACTABLE COVER APPARATUS

Barbara Bailey, 329 Slagle Rd., Leesville, La. 71446

Filed Dec. 5, 1988, Ser. No. 279,492
Int. Cl.[4] B60P 7/02
U.S. Cl. 296—98 1 Claim



1. A truck bed covering apparatus for use in combination with a truck bed assembly including an open truck bed formed of four side walls and a bottom wall wherein said truck bed covering apparatus comprises,

a pair of parallel pivoting arm means each of said pair pivotally secured relative to said truck bed proximate one terminal end of said arm means and

secured to flexible covering material proximate the other terminal end of each of said arm means, and

said covering material being of finite length defined by two ends wherein one end is secured to said interconnecting element and a second end is secured to a drum assembly means, and

said drum assembly means is secured by use of support rods to said truck bed and positioned proximate an upper side wall, and

said drum assembly means is positioned and formed for furling and unfurling said covering material about a central axis, and

said parallel pivoting arm means is pivotal from a first position enabling furling of said covering material and to a second position effecting unfurling of said drum assembly means, and

spring means mounted to each of said pair of pivoting arm means for normally biasing each of said pair of pivoting arm means to said second position, and

motive means enabling furling of said covering material, and

said motive means including a first sprocket coaxially aligned with said drum assembly means, and a second sprocket spaced from and underlying the first sprocket including a continuous chain member operative associating the first and second sprocket, and a manually manipulatable handle axially secured to and projecting outwardly of the second sprocket to enable retraction of the flexible covering material to the first position, and a detent sprocket coaxially aligned and operatively associated with said second sprocket to maintain the second sprocket to maintain the second sprocket in a selected position, and

further including a curvilinear contact surface member remote from said drum assembly positioned between said central axis and said truck bed for maintaining said cover materials in a wrinkle-free condition during furling and unfurling thereof by the drum assembly means.

4,893,865
UNITIZED COWL AND WIPER ARM ASSEMBLY

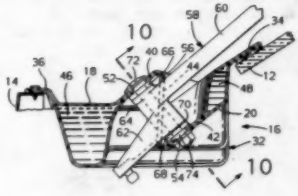
Michael J. McClain, Dayton; Harry C. Buchanan, Jr., Spring Valley, and Glenn R. Reed, Dayton, all of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 11, 1988, Ser. No. 230,942
Int. Cl.[4] B62D 25/08
U.S. Cl. 296—192 3 Claims

1. A unitized cowl and wiper arm assembly for a vehicle having a windshield and vehicle body a portion of which is spaced from a windshield, said assembly comprising,

a wiper arm having a drive member at one end and a blade support at the other end offset from one another, and,

a shell having upper and lower panels seamed together at their outer edges to form a structurally complete member with first and second peripheral flanges adapted to be secured to said vehicle body portion and windshield respectively, said lower panel being crimped up against said upper panel at a first location substantially midway between said peripheral flanges and said upper panel being crimped down in the opposite direction against said lower panel at a second location adjacent said first location so as to create a localized area of increased stiffness integral



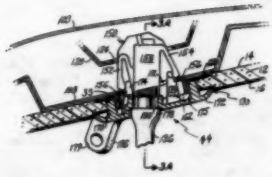
with said shell bounded by a lower shell portion offset at a central wall from an upper shell portion sufficiently to allow said wiper arm to pass through an aperture in said central wall and between said upper and lower shell portions,

whereby, said wiper arm may be passed through said aperture at said area of increased stiffness and pivoted to said shell at said area with said blade support located above said lower shell portion and with said drive member located below said upper shell portion, thereby forming an assembly that can be installed to said vehicle as a unit, after which any disturbing forces acting on said wiper arm will be resisted by said area of increased stiffness and substantially the entire shell.

4,893,866
MOTOR VEHICLE BODY STRUCTURE FOR RECEIVING SNAP-FIT MODULAR HEADLINER FASTENERS

James D. Dowd, Farmington Hills, and David M. Hilborn, Sterling Heights, both of Mich., assignors to United Technologies Automotive Inc., Dearborn, Mich.

Filed Jun. 10, 1988, Ser. No. 204,663
Int. Cl.[4] B60J 7/08
U.S. Cl. 296—214 10 Claims



1. A motor vehicle body support structure for receiving a snap-fit modular headliner wherein the motor vehicle has a front and back, a roof, a left side and a right side, which comprises:

left side A-pillar sheet metal means extending in a generally horizontal plan adjacent the front left side of the roof and defining a left side A-pillar opening having a longitudinal axis extending in a first direction; and

right side A-pillar sheet metal means extending in a generally

horizontal plane adjacent the front right side of the roof and defining a right side A-pillar opening having a longitudinal axis extending in said first direction; and

a header extending adjacent the roof from the left side A-pillar sheet metal means to the right side A-pillar sheet metal means, said header defining a left side header opening having a longitudinal axis extending in a second direction generally perpendicular to said first direction and a right side header opening extending in said second direction, said header openings being positioned in alignment with the A-pillar openings.

4,893,867

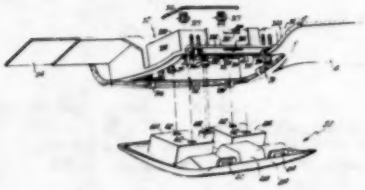
CONSOLE MOUNTED TO A HEADLINER

David M. Hilborn, Sterling Heights, and Stephen P. McGarry, Rochester Hills, both of Mich., assignors to United Technologies Automotive Inc., Dearborn, Mich.

Filed Jun. 10, 1988, Ser. No. 205,265

Int. Cl.[4] B60J 7/08

U.S. Cl. 296—214 **31 Claims**



11. A combination headliner and console for a motor vehicle having a roof, which comprises:

a substrate generally configured to be mounted adjacent the roof, said substrate having a decorative surface facing the interior of the vehicle when the substrate is assembled to the vehicle and a non-show surface facing the roof of the vehicle;

said substrate defining a substrate opening therein; and

a console sized to fit within said opening, said console including fastening means for securing the console to the substrate with the console mounted within the opening, said console further including a trim bezel sized to cover said opening;

said trim bezel extending to mate with the decorative surface of the adjacent substrate to fully cover the opening and to eliminate large gaps between the bezel and the substrate;

said substrate including a depressed portion displaced downwardly therefrom and wherein the opening is defined within the depressed portion.

4,893,868

VEHICLE DOOR-TO-DOOR SUNROOF ASSEMBLY

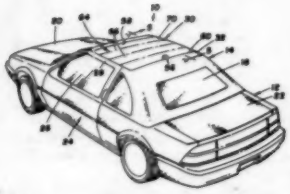
William D. Miller, Troy, Mich.; Alain J. Cleset, Santa Barbara, Calif., and Charles P. Hines, Northville, Mich., assignors to Cars & Concepts, Inc., Brighton, Mich.

Filed Jul. 18, 1988, Ser. No. 220,623

Int. Cl.[4] B60J 7/047, 7/06

U.S. Cl. 296—219 **13 Claims**

1. In a vehicle body including an outer roof panel having side edges and also having inner rails that cooperate with the side edges of the outer roof panel to provide a pair of hollow side rails, and side doors having upper edges located adjacent the side edges of the outer roof panel, a sunroof assembly comprising: a roof opening in the outer roof panel; said roof opening having forward and rearward edges and having side edges exposing the interior of the side rails of the roof; a pair of tracks each of which includes a plurality of inclined ramps and horizontally extending portions connecting the ramps; each ramp extending downwardly in a forward direction; one of the tracks being mounted within one of the side rails and the other track being mounted within the other side rail; a sunroof including a plurality of panels having elongated shapes extending laterally with respect to the vehicle body; each panel having opposite ends one of which has a front support mounted by one track in one of the side rails and the other of which has a front support mounted by the other track in the other side rail; said tracks cooperating to support the panels for forward and rearward movement with respect to the vehicle body; said panel ends being located generally adjacent the upper edges of



the closed side doors to provide a generally continuous door-to-door construction; said sunroof also including a flexible sheet-like cover that extends between the panels and has connections to the panels; said connections to adjacent panels being spaced along the cover with greater spacings than the front-to-rear dimensions of the panels; and said sunroof being movable between a closed position with respect to the roof opening where the panels are spaced from each other with the cover extending therebetween and an open position where the panels are positioned adjacent the rear edge of the roof opening in a partially overlapping relationship with the cover stored therebetween in a folded condition.

4,893,869

VEHICLE ROOF

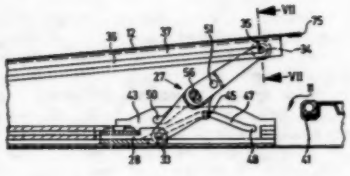
Arpad Puerst, Germering, Fed. Rep. of Germany, assignor to Webasto AG Fahrzeugtechnik, Stockdorf, Fed. Rep. of Germany

Filed Oct. 19, 1988, Ser. No. 259,774

Claims priority, application Fed. Rep. of Germany, Oct. 22, 1987, 3735686

Int. Cl.[4] B60J 7/057

U.S. Cl. 296—220 **29 Claims**



1. A vehicle roof having a cover which, at a front edge, is slidably guided in lateral guide rails extending below a fixed roof surface, said cover being additionally supported at the guide rails by lifting levers, each of said lifting levers being connected at a first end with a respective guide rail and at an opposite end with the cover, in a manner enabling said levers to be displaceable relative to said guide rails in a vehicle longitudinal direction and to be pivotable around parallel rotational axes, during displacement in the vehicle longitudinal direction, by a pin and slot type interaction with a fixed roof-mounted retaining bracket, whereby the cover, selectively, can be

shifted to a closed position covering an opening in the fixed roof surface, a vent position wherein a rear edge of the cover is lifted above the fixed roof surface by a pivoting movement, and an open position wherein the cover is rearwardly retracted above the fixed roof surface; wherein separate first and second drive elements are provided permanently coupled, respectively, with the cover and with one of the lifting lever ends for producing the longitudinal and pivotal displacements of the cover.

4,893,870

DRIVE APPARATUS OF A ROOF STRUCTURE FOR A VEHICLE

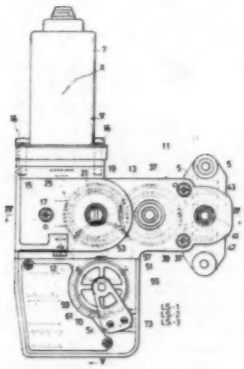
Masaichi Moriya; Masaaki Miyamoto; Kazumi Nakahara, and Junichi Maekawa, all of Yokohama, Japan, assignors to Ohi Seisakusho Co., Ltd., Yokohama, Japan

Continuation of Ser. No. 96,536, Sep. 15, 1987, abandoned. This application May 15, 1989, Ser. No. 352,624

Claims priority, application Japan, Sep. 25, 1986, 61-226603; Jan. 16, 1987, 62-3599; Feb. 13, 1987, 62-29821

Int. Cl.[4] B60J 7/057

U.S. Cl. 296—223 **5 Claims**



1. A drive apparatus of a roof structure for a vehicle, said apparatus comprising:

a positionable lid disposed in the roof structure;

a drive gear system rotatably supported by a casing of the apparatus;

a first transmission gear drive means for opening and closing the lid;

switch means having a plurality of switches stacked with respect to each other and attached to the casing by attachment means;

a second transmission gear control means including a rotary member having a plurality of stacked rotary control surfaces thereon, each surface in controlling contact with a respectively positioned one of the switches for switching the switches to detect the position of the lid, said plurality of control surfaces being disposed in upward and downward positions of the outer circumferences of the rotary member such that positions of all of the switches are completely adjusted by determining only one of the positions thereof at the attachment means;

a motor;

a main gear and a main shaft, disposed in said drive gear system; and

means for connecting the motor, the main gear and the main shaft; wherein

said motor being connected to drive the main shaft through the main gear, said first and second transmission gear means being driven by the motor through said means for connecting;

said rotary member being disposed such that the rotary member does not overlap and does not underlap the main gear and the first transmission gear drive means.

4,893,871

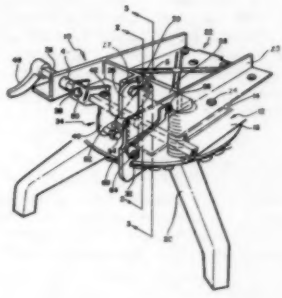
SWIVEL ROCKER STOP ASSEMBLY

Jerome R. Kowalski, Hickory, N.C., assignor to Hickory Springs Manufacturing Co., Hickory, N.C.

Filed Dec. 12, 1988, Ser. No. 283,242

Int. Cl.[4] A47C 3/02

U.S. Cl. 297—270 **15 Claims**



1. In a rocker-swivel assembly of the type having a rocker unit including first and second spaced rocker plates connected for relative rocking movement about a generally horizontal rocking axis and a swivel plate connected to said first rocker plate for relative rotational swiveling movement about a generally vertical swiveling axis, the improvement comprising means, coupled to one of said second rocker plate and said swivel plate and movable selectively into and out of a locking disposition in gripping engagement with the other of said second rocker plate and said swivel plate, for selectively disabling both said relative rocking movement of said rocker plates and said relative rotational movement of said swivel plate and said first rocker plate, and manually-operable actuating means connected to said disabling means for selectively manipulating movement thereof into and out of said locking disposition.

4,893,872

OFFICE CHAIR WITH WAIST SUPPORTER

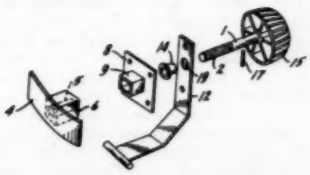
Kiyoshi Sugai, Kawagoe, Japan, assignor to United Business Systems, Taiwan and Moriya & Co., Ltd., Tokyo, Japan

Filed Mar. 17, 1988, Ser. No. 169,327

Claims priority, application Japan, Jul. 18, 1987, 62-109584; Taiwan, Oct. 3, 1987, 76209618

Int. Cl.[4] A47C 7/02

U.S. Cl. 297—284 **2 Claims**



1. A waist supporter for an office chair having a back board

frame (11) covered, on the user's side, with buffer material (21), said waist supporter including, in combination,

a generally planar waist support member (4) disposed within a cavity (22) in the buffer material (21), and

means for moving the waist support member toward and away from the back board frame (11), said means comprising

locating structure (8, 9, 8', 8', 9'9') fixed to back board frame (11) and projecting toward the waist support member (4),

guide means (6) carried by the waist support member (4) and projecting toward the back board frame (11),

said locating structure being non-rotatably and telescopically coupled with the guide means for adjusting movement toward and away from the waist support member,

adjustment means (15, 1, 16, 17, 2, 5) for moving the locating structure toward and away from the guide means,

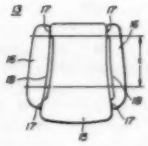
said adjustment means including screw means (1, 19, 14, 17, 12, 15, 16) which are rotatable, but not reciprocable, with respect to the back board frame, and connector means (2, 5) which cooperate to permit the guide means, and thus the waist support member, to move toward and away from the back board frame.

4,893,873

SEAT CUSHION ASSEMBLY

Hiroaki Iwamoto, and Masaaki Kogure, both of Kanagawa, Japan, assignors to Ikeda Bussan Co., Ltd., Ayase, Japan

Filed Jan. 13, 1989, Ser. No. 296,968
Claims priority, application Japan, Jan. 19, 1988, 63-4885[U]
Int. Cl.[4] A47C 7/18
U.S. Cl. 297—452 4 Claims



1. A seat cushion assembly comprising:

a seat frame having opposed side frame portions;

a foam cushion pad including a major part and longitudinally extending side parts each having two end portions, and which are arranged along both sides of said major part, said cushion pad being directly mounted on said seat frame having said side parts thereof respectively directly mounted on said opposed side frame portions; and

an outer skin member covering each of said major and side parts of said cushion pad,

wherein each side part is connected only at both end portions thereof to said major part leaving an intermediate portion thereof separated from said major part.

4,893,874

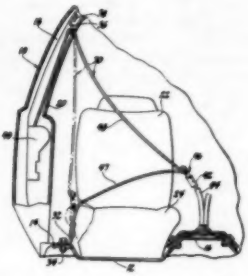
FREE FALLING LATCH PLATE ASSEMBLY

Keith D. Childress, Richmond; Thomas J. Corbett, Sterling Heights, and Michele A. Smith, Davisburg, all of Mich., assignors to Saturn Corporation, Troy, Mich.

Continuation-in-part of Ser. No. 74,199, Jul. 16, 1987. This application Oct. 5, 1988, Ser. No. 253,528
Int. Cl.[4] A62B 35/00
U.S. Cl. 297—483 8 Claims

1. In a seat belt system with a continuous length of belt having an upper end mounted adjacent the occupant shoulder and a lower end mounted adjacent the occupant lap, a retractor associated with at least one end of the belt to pull the belt to a stored condition extending generally vertically between the upper and lower ends and permit extension of the belt across the torso of a seated occupant for buckling by a belt buckle mounted inboard of the seat, and a latch plate carried by the belt for engagement by the buckle and including a housing having a planar base wall with a tongue projecting from one end thereof for latching engagement by the buckle, a pair of flanges integral with the base wall and extending perpendicularly therefrom at a lateral spacing somewhat greater than the width of the belt, and a lock bar slidably mounted in slots provided in the flanges, the improvement comprising:

said housing being oriented with the flanges facing toward the occupant torso and the belt being routed through the space between the base wall and the sliding bar so that when the belt is stored extending generally vertically between the upper and lower anchors, the belt extends in



a minimally convoluted path through the latch plate, thereby permitting gravity induced sliding movement of the latch plate along the belt toward the lower anchor;

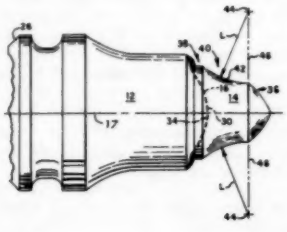
and an abutment structure carried by the housing at the end thereof opposite the tongue and adapted upon the migration of the sliding lock bar along the slot with the occurrence of generally colinear overlying orientation of the lap and shoulder belts upon buckling of the belt to introduce a substantially convoluted path of the belt through the latch plate and trap the belt between the sliding lock bar and the abutment structure so that the belt is cinched and travel of the belt through the latch plate is effectively prevented at least in the direction which would extend the length of the lap belt portion.

4,893,875

GROUND ENGAGING BIT HAVING A HARDENED TIP

Alan H. Loan, Edelstein, and Gene R. Klett, Washington, both of Ill., assignors to Caterpillar Inc., Peoria, Ill.

Filed Dec. 16, 1988, Ser. No. 285,564
Int. Cl.[4] E21C 35/18
U.S. Cl. 299—91 7 Claims



1. A ground engaging bit, comprising:

a body having a generally convex non-linear forward end surface; and

a hardened tip having a generally concave non-linear rearward end surface mating with the generally convex non-linear forward end surface of the body, said rearward end surface of the hardened tip being bonded to the forward end surface of the body and the hardened tip also having a substantially conical forward end portion, a cylindrical rearward flange portion, and a middle portion having a continuous concave surface of revolution disposed between and merging at its opposite ends with the forward end portion and the rearward flange portion, said continuous concave surface of revolution defining a radius having a center of radius located substantially on a plane which passes through the intersection of the conical forward end portion and the middle portion and the radius has a length (L) approximately twenty to thirty five percent less than the diameter of the rearward flange portion.

4,893,876

PROCESS AND APPARATUS FOR PRODUCING BRISTLE ARTICLES AND USE OF THE PROCESS FOR IMPLEMENTS HAVING A SIMILAR CONSTRUCTION

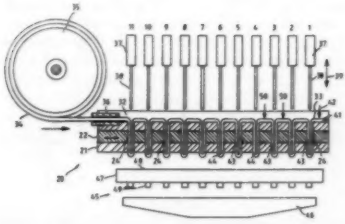
Georg Welhrsach, Wald-Michelbach, Fed. Rep. of Germany, assignor to Coronet-Werke Heinrich Schlerf GmbH, Wald-Michelbach, Fed. Rep. of Germany

Filed Jun. 10, 1988, Ser. No. 204,735

Claims priority, application Fed. Rep. of Germany, Jun. 13, 1987, 3719823

Int. Cl.[4] A46D *1/00*

U.S. Cl. 300—8 **38 Claims**



1. In a process for producing bristle articles such as brushes, brooms, paintbrushes, combs, and mats comprising combining a bristle carrier and bristles, optionally combined into bundles and connected thereto, in spaced manner in at least one row, a bristle section is shaped by means of a drawing tool to a double layer whilst forming a loop and the loop is fixed by one of its ends to the bristle carrier, the improvement comprising said bristle section is drawn from an endless strand wound onto a roll in a length corresponding to the length required for all the bristles of a row, plus a length resulting from the sum of the spacing of the bristles of a row, the length is then secured at its free end and all the loops in the row are drawn from the bristle section, accompanied by removing the necessary length from the roll and finally simultaneously fixing all of the loops by one of their ends to the bristle carrier.

4,893,877

SELF-GENERATED LIGHTED HUBCAB

Manual Powell, 8210 Woodlawn Ave., Detroit, Mich. 48213, and Lawrence J. Goffney, Jr., Detroit, Mich., assignors to Manual Powell, Detroit, Mich.

Filed Aug. 23, 1988, Ser. No. 235,179

Int. Cl.[4] B60Q *1/26*

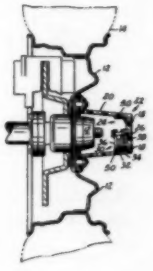
U.S. Cl. 301—108 R **3 Claims**

1. A lighted hubcap assembly comprising:

a cap body having an outboard side and an opposing inboard side, the cap body for securement to the wheel of a passenger vehicle with the outboard side facing away from the vehicle, the cap body including a cantilevered bearing mount extending from the inboard side generally perpendicularly to the cap body;

a permanent magnet assembly including contiguous, oppositely polarized magnetic arcuate sections forming together a north side and a south side, each side being bounded by and affixed to a soft iron hemidisc which is polarized in accordance with the polarity of the arcuate section that bounds the hemidisc, the permanent magnet assembly having a center of gravity disposed remotely from the bearing mount, so that any tendancy for the permanent magnet assembly to rotate with a pivoting of the bearing mount, which rotates with the cap body, will produce a moment generated by the force of gravity to realign the permanent magnet assembly to a substantially fixed orientation;

bearings rotatably mounting the permanent magnet assembly to the bearing mount of the permanent magnet assembly so that the permanent magnet assembly is kept in a substantially fixed orientation with respect to the passenger vehicle when the vehicle wheel rotates relative thereto;



at least one light emitting diode mounted on the cap body so that light from the diode is emitted from the outboard side of the cap body when the diodes are energized;

electrically conducting windings secured to the inboard side concentrically about the permanent magnet assembly and connected to the light emitting means, the windings being in magnetic flux coupling relationship with the permanent magnet assembly so that upon rotation of the wheel and, concomitantly, the windings about the generally fixedly oriented permanent magnet assembly, alternating current is generated in the winding for energizing the light emitting means.

4,893,878

INLINE PROPORTIONING VALVE FOR BRAKE SYSTEMS

Joe S. Cole, Mesquite, and Jack D. Hutcheson, Garland, both of Tex., assignors to Hilite Industries, Inc., Carrollton, Tex.

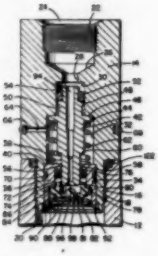
Filed Sep. 27, 1988, Ser. No. 249,682

Int. Cl.[4] B60T *8/26*

U.S. Cl. 303—9.75 **7 Claims**

1. An inline proportioning valve for the hydraulic brake system of a vehicle comprising a housing of one-piece construction with one end of the housing being connected with a master cylinder of the brake system and the other end of the housing being connected with a fluid flow line extending to vehicle wheel cylinders, said housing including an axial inlet port in the end thereof connected with the master cylinder and an outlet port in the end thereof connected to the fluid flow line, said housing including a plurality of axially extending chambers in communication with each other with each chamber being of cylindrical configuration and decreasing in diameter from the inlet port to the outlet port, said housing including three chambers with a peripheral, radially extending shoulder

at the juncture between adjacent chambers, a differential area piston positioned in said chambers in sealed relation thereto, said piston including an axial passageway therethrough, said piston including a larger pressure contact area in the chamber adjacent the outlet port than the pressure contact area in the chamber adjacent the inlet port whereby pressure passing through the passageway in the piston will react against the piston to force the piston towards the inlet port due to the differential contact areas, calibrated spring means biasing the piston toward the outlet port to resist movement of the piston toward the inlet port, said chamber adjacent the inlet port including an insert engaging the shoulder at the inner end of the chamber adjacent the inlet port with the insert forming a closure for the chamber adjacent the inlet port and including a central opening guidingly receiving the piston with the diameter of the portion of the piston guided by the insert being



smaller than the diameter of the piston received in the chamber adjacent the outlet port, a valve member mounted in the insert in normally open relation to the passageway through the piston to enable pressure flow through the piston, said valve member closing the passageway through the piston when the piston moves toward the inlet port to control and stop flow through the passageway when the differential piston is moved a predetermined distance toward the inlet port by compressing the calibrated spring means, said housing includes a radial vent passage communicating with the central chamber in the housing, a peripheral groove in the exterior of the housing communicated with the vent passage and an O-ring seal in the peripheral groove forming a closure for the vent passage but enabling outflow of pressure which may leak into the central chamber of the housing but preventing inflow of air and preventing entrainment of particulate into the interior of the housing.

4,893,879

FAIL-SAFE WHEEL SERVICE BRAKE SYSTEM

Paul J. Middelhoven, 10948 SE Ankeny, Portland, Oreg. 97216; Mark J. Albertson, 14701 S.E. Valencia, #90, Vancouver, Wash. 98684, and Eric Johnson, 1525 S.W. Miller Ct., Gresham, Oreg. 97080

Filed Feb. 12, 1988, Ser. No. 155,204

Int. Cl.[4] B60T *13/22*; F16D *65/24*; B60K *41/26*

U.S. Cl. 303—71 **7 Claims**

1. A wheel braking system for a vehicle comprising:

brake housing for association with a vehicle wheel,

rotatable wheel means extending into the brake housing,

friction means movable into frictional interaction with the wheel means for retarding and stopping wheel rotation,

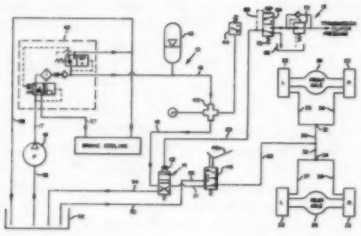
braking means including energy storage means within the brake housing for applying a braking force to the friction means and moving the friction means into frictional interaction with the rotatable wheel means to retard and stop wheel rotation,

fluid pressure-operated brake release means for applying a brake releasing force in opposition to the braking force applied by the braking means to release the friction means from frictional interaction with the rotatable wheel means,

brake release operating means for selectively operating the brake release means and operable to control the magnitude of the brake releasing force to provide a controlled release of the friction means,

the braking means comprising a brake piston means and the energy storage means comprising mechanical spring means,

the brake release means comprising a fluid pressure chamber within the housing defined in part by the piston means such that fluid pressure applied to the piston means within the chamber urges the piston means away from the friction means in opposition to the spring means,



the brake release operating means including a first manually operable brake valve means in a pressure fluid circuit for controlling the fluid pressure within the fluid pressure chamber and thereby the brake releasing force, and

a second manually operable valve means operable in a first position to activate the first valve means and operable in a second position to deactivate the first valve means to prevent operation of the brake release means, wherein the second valve means includes a manually-operated park valve member and a pilot pressure-operated control valve member, the control valve member being operated by pilot pressure from a transmission clutch fluid pressure circuit.

4,893,880

ANTI-SKID CONTROL APPARATUS FOR A VEHICLE BRAKING SYSTEM

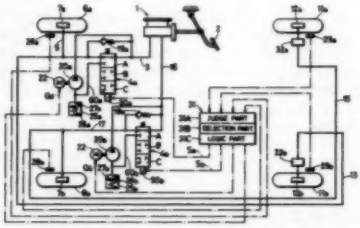
Tetsuro Arikawa, Kanagawa, Japan, assignor to Nippon A B S, Ltd., Tokyo, Japan

Filed May 13, 1988, Ser. No. 194,414

Claims priority, application Japan, May 16, 1987, 62-119832

Int. Cl.[4] B60T *8/62*

U.S. Cl. 303—110 **44 Claims**



1. In an anti-skid control apparatus for a vehicle braking system including:

(A) a pair of front wheels, and a pair of rear wheels;

(B) wheel speed sensors associated with said wheels, respectively;

(C) a first fluid pressure control valve device for controlling the brake fluid pressure of the wheel cylinder of one of said front wheels, arranged between a first fluid pressure

generating chamber of a tandem master cylinder and said wheel cylinder of the one front wheel;

(D) a second fluid pressure control valve device for controlling the brake fluid pressure of the wheel cylinder of another of said front wheels, arranged between a second fluid pressure generating chamber of said tandem master cylinder and said wheel cylinder of the other front wheel; and

(E) a control unit receiving outputs of said wheel speed sensors for measuring or judging the skid conditions of said front and rear wheels and for generating instructions for controlling said first and second fluid pressure control valve devices and in which said control unit discriminates the frictionally lower one (designated as "low side") of the sides of the road on which said wheels are running, on the basis of the measuring or judging results of the skid conditions of said rear and/or front wheels, combines logically the measuring or judging result of the skid condition of the one rear wheel running on said low side of the road, with that of the one front wheel running on the same side as said low side, for generating the instruction for controlling said first or second fluid pressure control valve device for the corresponding front wheel, and generates the instruction for controlling said second or first fluid pressure control valve device for the other front wheel, on the basis of the measuring or judging result of the skid condition of the other front wheel running on the high side (frictionally higher side) independently of those of said rear wheels, the improvements in which a brake relieving instruction for decreasing the brake fluid pressure, of the instructions for controlling the first or second fluid pressure control valve device, is formed on the basis of the judging result of the one of the front wheel and rear wheel on the low side which generates a brake relieving signal for decreasing the brake fluid pressure, sooner than the other thereof.

4,893,881

HYDRAULIC ANTI-LOCK BRAKING SYSTEMS FOR VEHICLES

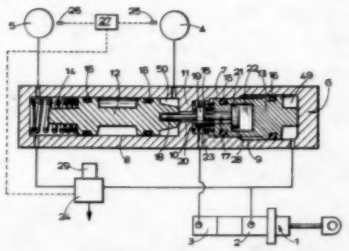
Glyn P. R. Farr, Warwickshire, England, assignor to Lucas Industries Public Limited Company, Birmingham, England

Filed Sep. 26, 1988, Ser. No. 249,443

Claims priority, application United Kingdom, Oct. 3, 1987, 8723269

Int. Cl.[4] B60T *8/34, 8/32*

U.S. Cl. 303—113 **20 Claims**



1. An hydraulic anti-lock braking system for a vehicle of the four wheel type comprising first and second separate brake means, a tandem master cylinder having a primary pressure space, and a secondary pressure space, an anti-lock modulator, and a copy value, wherein said valve comprises a housing having a first bore, and a second bore of stepped outline, a partition between said first and second bores, a first piston working in said first bore and hydraulically connected at opposite ends to said separate brake means, a second piston working in said second bore and hydraulically connected at opposite ends to said pressure spaces of said master cylinder, said second piston being of complementary differential outline, said pistons being movable relative to each other between a first operative position, a second position in which said first piston moves relatively away from said second piston, and a third position in which said second piston moves relatively away from said first piston, and an isolating valve co-operating with both said pistons and said partition, said isolating valve being in an open position when said pistons are in said first position, in a closed position when said pistons are in said second positions, and in an open position when said pistons are in said third position, said second piston having outer and inner ends, connecting means connecting said primary pressure space to said outer end, and a first spring means acting between said inner end and said partition to urge said second piston relatively away from said partition whereby upon failure of said connecting means said pistons are moveable into said third position by said first spring means, and said second piston co-operates with said isolating valve to hold said isolating valve open.

4,893,882

ANTILOCKING SYSTEM

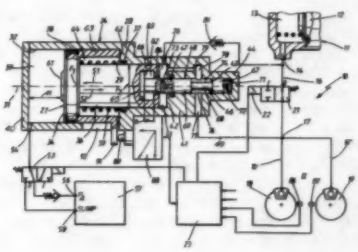
Heinz Leiber, Oberriexingen, and Manfred Steiner, Stuttgart, both of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Apr. 17, 1989, Ser. No. 339,109

Claims priority, application Fed. Rep. of Germany, Apr. 16, 1988, 3812832

Int. Cl.[4] B60T *8/32/8/42*

U.S. Cl. 303—115 **20 Claims**



1. Antilocking installation for a road vehicle having a hydraulic multi-circuit brake system which includes at least one static brake circuit which is connected to an outlet pressure space of a brake unit means for providing brake pressure to the wheel brakes;

the outlet pressure space of the brake unit is connected to the wheel brakes of the static brake circuit by means of an electrically actuated brake pressure control valve means;

the brake pressure system providing for controlling brake pressure reduction, brake pressure retention and brake pressure restoration phases for antilocking control installation, and operating on the pump-back principle, at least when the antilocking control system demands high magnitude pressure reductions according to which, in a pressure reduction phase, brake fluid is drained from the wheel brakes subject to the control system and is pumped back into the output pressure space of the brake unit;

a pumping means is provided for this pumping back and includes:

a stepped cylinder with two bore sections of different diameters, offset relative to one another by means of a radial housing step;

a displaceable step piston means located in these bore sections and having piston flanges of correspondingly different diameters;

the stepped piston means being guided so that it can be displaced in a pressure-tight manner;

the larger diameter flange of the stepped piston means forming an axially movable boundary of a drive pressure space;

an electrically actuatable antilocking control valve means for connecting the drive pressure space with a high pressure outlet of a hydraulic auxiliary pressure source and for alternatively connecting the pressure space to a sump tank of the auxiliary pressure source for displacing the stepped piston means;

the small diameter flange of the stepped piston means forming a movable boundary of a functional chamber acting as the pump chamber in pump-back operation of the brake pressure setting means;

said functional chamber being connected via an outlet non-return valve means to the output pressure space associated with the static brake circuit and via an inlet valve means to the wheel brakes of the static brake circuit;

a return spring means for biasing the stepped piston means into a position associated with a maximum volume of the functional chamber which can be connected to the wheel brakes;

an electronic control means providing actuation signals for switching of a brake pressure control valve means and the electrically actuatable antilocking control valve means in response to a process of comparing and differentiating electrical output signals from wheel rotational speed sensors which are a measure of wheel peripheral speeds in signal level and/or frequency;

wherein the inlet valve means is designed as a 2/2-way valve controlled by motion of the stepped piston;

wherein the inlet valve means is held in an open position when the stepped piston is positioned to cause a minimum volume of the functional chamber which can be connected to the wheel brakes,

wherein the inlet valve means, starting from this open position, can only reach its shut off position by a displacement of the stepped piston means taking place in the sense of increasing the volume of functional chamber;

wherein when the stepped means piston has reached a position in the immediate vicinity of its end position associated with a maximum volume of the functional chamber, the inlet valve means returns to an open position caused by a displacement of the stepped piston means taking place in the sense of reducing the volume of the functional chamber after the stepped piston means has executed a minimum stroke, relative to this end position;

a position indicator means for generating electrical output signals which are characteristic of the positions of the stepped piston means and which continually vary with changes in the position;

the output signal of the position indicator being applied as an additional information input to the electronic control unit means which generates signals in response to the position of the stepped piston means for switching over the antilocking control valve means to a pump-back operation of the stepped piston;

and wherein a difference in volume of the functional chamber between its maximum and minimum values is between 1/5 and ½ of that volume of brake fluid which must be forced into the wheel brakes of the static brake circuit in order to achieve the maximum brake pressure permitted by the brake installation.

4,893,883

BELT TENSION CONTROL SYSTEM

Ronald L. Satzler, Princeville, Ill., assignor to Caterpillar Inc., Peoria, Ill.

Filed Mar. 2, 1988, Ser. No. 162,830
Int. Cl.[4] B62D 55/30
U.S. Cl. 305—10 **6 Claims**

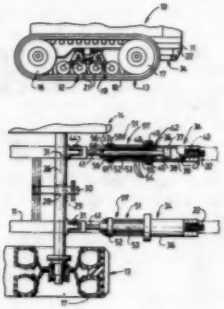
1. A belt tension control system for maintaining tension in an endless drive belt entrained about a drive wheel and an idler wheel, said idler wheel being movable relative to the drive wheel for adjusting the tension in the belt, comprising:

a hydraulic actuator including a cylinder, a piston slidably disposed in the cylinder and defining an actuating chamber, and a piston rod connected to the piston, one of the cylinder and the piston rod being operatively connected to one of the wheels and movable in a first direction to increase tension in the belt when the actuating chamber is pressurized;

a pump;

conduit means connecting the pump to the actuating chamber;

means for establishing a fluid pressure in the conduit means and the actuating chamber at a level sufficient to generate



a predetermined belt tension in the belt when the pump is operating;

recoil means for permitting the displacement of pressurized fluid from the actuating chamber so that said one of the cylinder and the piston rod can move in a second opposite direction when foreign matter becomes trapped between the drive belt and one of the wheels; and

means for frictionally locking the piston rod relative to the cylinder and maintaining the predetermined belt tension in the belt when the pump stops operating and the fluid pressure established by the fluid pressure establishing means drops below a predetermined level.

4,893,884

WALL CABINET

Shigeki Tsuchida, Kusatsu; Sabaroo Sumi, Omihachiman, and Motohiro Nakagawa, Ikoma, all of Japan, assignors to Itoki Co., Ltd. and Itoki Kosakusho Co., Ltd., both of Osaka, Japan

Filed Jan. 27, 1989, Ser. No. 302,526
Int. Cl.[4] A47B 77/00
U.S. Cl. 312—107 **10 Claims**

1. A wall cabinet held between a floor and a ceiling, said wall cabinet comprising:

a container part including various cabinets, said container part having upper and lower base plates;

a first adjustable means positioned at said lower base plate

for adjusting a distance between said lower base plate and the floor;

an under frame extending from a circumference of said lower base plate toward the floor for covering said first adjustable means;

a second adjustable means positioned at said upper base plate for adjusting a distance between said upper base plate and said ceiling, said second adjustable means having upper and lower top frames slidably interposed, and a locking member for locking said upper and lower top frames in order to conform with the distance between said upper base plate and said ceiling.

4,893,885

MODULAR KITCHEN UNIT

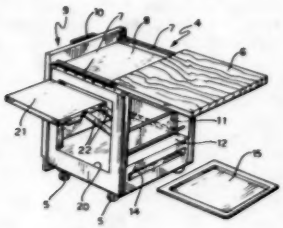
Marco Borello, Genova, Italy, assignor to Salvarani Industrie S.p.A., Parma, Italy

Filed Dec. 15, 1988, Ser. No. 284,636

Claims priority, application Italy, Mar. 3, 1988, 52939/88[U]

Int. Cl.[4] A47B *91/00*

U.S. Cl. 312—250 **2 Claims**



1. A movable unit for a modular kitchen, said unit having wheels and being adapted to be removably located in a space provided below a countertop forming part of said modular kitchen, said unit comprising:

housing means having front, rear, two side and bottom walls defining compartment means therein, said front wall being adapted to match said modular kitchen when said unit is fitted into said space;

said compartment means comprising an upper compartment, a guide means provided on an upper surface of said housing and a slidable cutting board movably mounted on said guide means to provide access to said upper compartment;

said rear wall having a recess therein defining a lower shelf for supporting a plurality of containers and retaining means associated with said recess for holding said containers on said lower shelf;

one of said side walls having a recess therein defining a lower shelf, said lower shelf having a plurality of slot means formed therein for vertically supporting cutlery in said recess;

said compartment means including a main compartment, the other of said side walls having an opening providing access to said main compartment; and

auxiliary shelf means movably supported on lever means in said housing for movement between a position within said housing and a raised position in which said auxiliary shelf projects from the unit through said opening.

4,893,886

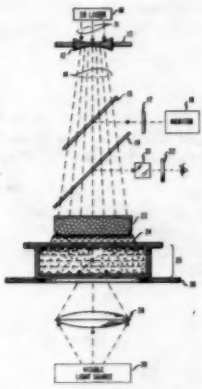
NON-DESTRUCTIVE OPTICAL TRAP FOR BIOLOGICAL PARTICLES AND METHOD OF DOING SAME

Arthur Ashkin, Rumson, and Joseph M. Dziedzic, Clark, both of N.J., assignors to American Telephone and Telegraph Company, New York, N.Y. and AT&T Bell Laboratories, Murray Hill, N.J.

Filed Sep. 17, 1987, Ser. No. 98,120

Int. Cl.[4] G02B *27/00*

U.S. Cl. 350—1.1 **5 Claims**



1. Apparatus for generating a single-beam gradient force optical trap of particles, said apparatus comprising a laser for generating a light beam at a predetermined wavelength and means for focusing said light beam with sufficient convergence to form said optical trap in a predetermined region, said apparatus

characterized in that

said predetermined wavelength is substantially included in the infrared range of wavelengths between 0.8 μm and 1.8 μm inclusively, so that said trap non-destructively confines at least one biological particle.

4,893,887

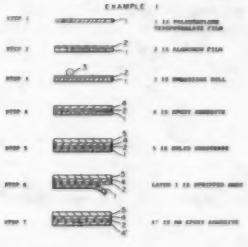
HOLOGRAPHIC IMAGE TRANSFER PROCESS

Don M. Coates, Midlothian, Va., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 12, 1983, Ser. No. 560,747

Int. Cl.[4] G03H *1/04*; G02B *5/18*

U.S. Cl. 350—3.6 **3 Claims**

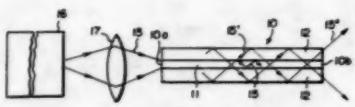


1. A process for applying a metallic hologram to a solid substrate which comprises the following steps in sequence:

(a) forming a thin metallic hologram;

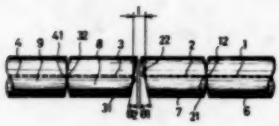
(b) coating a first side of said thin metallic hologram with a crosslinkable liquid adhesive resin;
(c) contacting the coating on the thin metallic hologram with a solid substrate;
(d) curing said crosslinkable liquid adhesive resin to form a tough solvent-resistant film while said metallic hologram and said solid substrate are in contact with said crosslinkable liquid adhesive resin;
(e) coating a second side of the thin metallic hologram with a transparent crosslinkable liquid adhesive resin; and
(f) curing the transparent liquid adhesive resin to form a tough solvent-resistant film while it is in contact with said second side of the thin metallic hologram.

4,893,888
OPTICAL WAVELENGTH CONVERTER DEVICE
Yoji Okazaki; Koji Kamiyama, and Masaki Okazaki, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan
Filed Jul. 20, 1988, Ser. No. 221,972
Claims priority, application Japan, Jul. 20, 1987, 62-180775; Jul. 19, 1988, 62-179644
Int. Cl.[4] G02B 6/10; H03F 7/00
U.S. Cl. 350—96.12 **7 Claims**



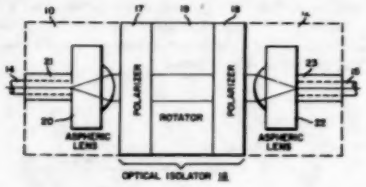
1. An optical wavelength converter device comprising:
(i) cladding having a first refractive index; and
(ii) a waveguide of a nonlinear optical material disposed in said cladding and having a second refractive index lower than said first refractive index, for converting the wavelength of a fundamental guided through said waveguide and radiating the wavelength converted waves into said cladding, said nonlinear optical material comprising an organic nonlinear optical material having a maximum light absorption coefficient at a wavelength close to the wavelength of at least one of said fundamental and said wavelength converted waves.

4,893,889
OPTICAL ATTENUATOR
Toyokazu Iwakiri; Akira Sugiyama; Yoshio Kashima; Ikuo Betsui, and Nobuo Suzuki, all of Tokyo, Japan, assignors to Seiko Instruments Inc., Tokyo, Japan
Filed Aug. 29, 1988, Ser. No. 237,893
Claims priority, application Japan, Sep. 4, 1987, 62-221485
Int. Cl.[4] G02B 6/26, 6/42
U.S. Cl. 350—96.15 **8 Claims**



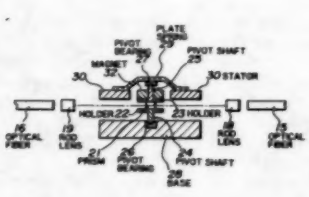
1. An optical attenuator comprising a pair of optical fibers having mutually facing non-parallel end surfaces separated by an air gap and having non facing end surfaces thereof polished spherically.

4,893,890
LOW-LOSS, HIGH-ISOLATION, FIBER-OPTIC ISOLATOR
George F. Lutes, 3509 Stancrest Dr., Glendale, Calif. 91208
Filed May 4, 1988, Ser. No. 190,185
Int. Cl.[4] G02B 6/32, 5/30; G02F 1/00
U.S. Cl. 350—96.18 **5 Claims**



1. A low-loss, high-isolation apparatus for isolating a source of an incident light beam transmitted through a first optical fiber a first portion of said beam of light reflected by a second optical fiber and scattered by an isolator assembly and for transmitting a second portion of said beam of light to said second optical fiber from said first optical fiber, comprising
an isolator assembly comprised of a Faraday rotator with parallel planar surfaces on opposite sides and two polarizers with planar surfaces parallel to said planar surfaces of said rotators, said polarizers being oriented at an angle between their directions of polarization equal to the angle α of rotation of said Faraday rotator, and
two aspheric lenses having their aspheric surfaces facing each other, and having said isolator assembly between them, and each having planar surfaces opposite said aspheric surfaces parallel to said planar surfaces of said rotator, each of said aspheric lenses having their axes angularly and laterally aligned, and having a narrow angle of acceptance of light, said narrow angle of acceptance being less than about 0.003 radians offset from the axes of said aspheric lenses for a loss of -30 dB, and less than about 0.0045 radians from their axes for a loss of -70 dB.

4,893,891
OPTICAL SWITCHING DEVICE INCLUDING PIVOT BEARING MECHANISM
Masayuki Fujita, and Sakashi Oyama, both of Tokyo, Japan, assignors to NEC Corporation, Japan
Filed Oct. 12, 1988, Ser. No. 256,634
Claims priority, application Japan, Oct. 15, 1987, 62-258377
Int. Cl.[4] G02B 6/36; H01H 67/02
U.S. Cl. 350—96.20 **10 Claims**



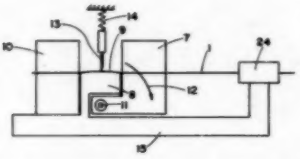
1. An optical switching device comprising:
an optical medium for changing-over optical paths,
a body for supporting said optical medium,
at least one input provided on said body,
at least one output provided on said body, and
a pivot bearing mechanism, wherein said optical medium is rotatively held in said body by means of said pivot bearing mechanism.

4,893,892

METHOD AND APPARATUS FOR CONNECTING MULTIPLE FIBER OPTIC CONDUCTORS

Gerhard Ziemek; Harry Staschewski, both of Langenhagen, and Klaus Procher, Lehrte, all of Fed. Rep. of Germany, assignors to Kabelmetal Electro GmbH, Hanover, Fed. Rep. of Germany

Filed Sep. 15, 1988, Ser. No. 244,847
Claims priority, application Fed. Rep. of Germany, Oct. 23, 1987, 3735886
Int. Cl.[4] G02B 6/40
U.S. Cl. 350—96.22 13 Claims



1. Method for connecting a first plurality of optical waveguides arranged in a first ribbon line to a second plurality of optical waveguides arranged in a second ribbon line, each optical waveguide of the first plurality of optical waveguides comprising a first glasfiber with a surrounding protective covering, each optical waveguide of the second plurality of optical waveguides comprising a second glasfiber with a surrounding protective covering, said first plurality of optical waveguides being positioned between two support tapes of said first ribbon line that maintain a first predetermined spacial orientation of said first glasfibers, said second plurality of optical waveguides being positioned between two support tapes of said second ribbon line that maintain a second predetermined spacial orientation of said second glasfibers; comprising the steps of:

removing an end portion of each of said two support tapes and said protective coverings from said first plurality of optical waveguides to expose first end portions of said first glasfibers, and removing an end portion of each of said two support tapes and said protective coverings from said second plurality of optical waveguides to expose second end portions of said second glasfibers;

fixing the spacial orientation of said first exposed end portions by clamping said first exposed end portions between a first terminal block and a second terminal block which maintain said first exposed end portions in axial tension, and fixing the spacial orientation of said second exposed end portions by clamping said second exposed end portions between a third terminal block and a fourth terminal block which maintain said second exposed end portions in axial tension;

scratching a surface of each of said first exposed end portions in axial tension in a first common plane, transverse of the axial direction of said first exposed end portions for causing each of said first exposed end portions to separate and form a new end face lying in said first common plane, and scratching a surface of each of said second exposed end portions in axial tension in a second common plane, transverse of the axial direction of said second exposed end portions for causing each of said second exposed end portions to separate and form a new end face lying in said second common plane;

maintaining the fixed spacial orientation of said first exposed end portions with said new end faces in said first common plane by means of said first terminal block, and maintaining the fixed spacial orientation of said second exposed end portions with said new end faces in said second plane by means of said third terminal block;

positioning said first and third terminal blocks in a face-to-face orientation, with said new end faces of said first exposed end portions adjacent to corresponding new end faces of said second exposed end portions; and

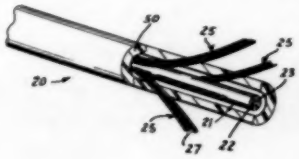
welding said new end faces of said first exposed end portions to said adjacent new end faces of said second exposed end portions.

4,893,893

STRENGTHENED BUFFERED OPTICAL FIBER

James D. Claxton, Lawrenceville; Gerald A. Scheidt, Dunwoody, and Stanley C. Shores, Atlanta, all of Ga., assignors to American Telephone and Telegraph Co., AT&T Bell Laboratories, Murray Hill and AT&T Technologies, Inc., Berkeley Heights, both of, N.J.

Continuation-in-part of Ser. No. 825,709, Jan. 31, 1986, abandoned. This application Feb. 8, 1988, Ser. No. 154,424
Int. Cl.[4] G02B 6/44
U.S. Cl. 350—96.23 16 Claims



1. A buffered optical fiber, which comprises:

an optical fiber which includes a silica glass composition optical core, a silica glass composition optical cladding and a protective ultra-violet cured coating which is disposed about said silica glass composition optical core and cladding and which engages said silica glass composition optical cladding and which has an outer diameter of about 300 μm;

at least one length of a fibrous strength member which entends along and in engagement with the coating of said optical fiber, said at least one fibrous strength member covering a substantial portion of the periphery of said optical fiber; and

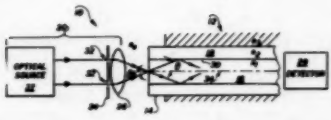
a buffer layer which encloses and engages said at least one strength member and which is made of a plastic material, said buffer layer having a compressive engagement with said at least one strength member which is controlled to achieve desired strippability of said buffer layer from said cable and to avoid microbending losses when said cable is subjected to a predetermined temperature range.

4,893,894

EVANESCENT SENSOR

Frank M. Caimi, Vero Beach, Fla., assignor to Mine Safety Appliances Company, Pittsburgh, Pa.

Filed Apr. 29, 1988, Ser. No. 187,860
Int. Cl.[4] G02B 6/02, 6/16
U.S. Cl. 350—96.29 11 Claims



1. A sensor for detecting species concentrations in an analyte comprising:

an optical fiber used for detecting species concentrations in an analyte, said optical fiber having a core and an intermediate dielectric layer circumferentially surrounding the core, said core having an index of refraction greater than

the index of refraction of the intermediate dielectric layer, said intermediate dielectric layer maintaining its integrity by not reacting with the analyte and enabling an evanescent wave to pass therethrough with minimal decay and being unreactive to light; and

a modal selector disposed to launch light into the core of the optical fiber at a desired mode.

4,893,895

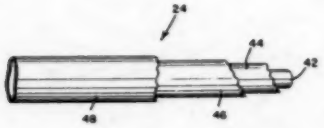
AN IMPROVED ENCASED HIGH TEMPERATURE OPTICAL FIBER

John W. Berthold, Salem, and H. Randy Carter, Alliance, both of Ohio, assignors to The Babcock & Wilcox Company, New Orleans, La.

Division of Ser. No. 177,751, Apr. 5, 1988, Pat. No. 4,843,234. This application Feb. 15, 1989, Ser. No. 311,312

Int. Cl.[4] G02B *6/20, 6/44*

U.S. Cl. 350—96.29 **5 Claims**



1. An encased optical fiber, comprising:

an optical fiber having a core, a doped cladding, and a buffer coating; and

a metal tube swaged on the optical fiber, said metal tube crimping the optical fiber with the buffer coating of the optical fiber yielding to the swaged metal tube so as to prevent the optical fiber from slipping therein.

4,893,896

ENERGY TRANSMISSION OPTICAL FIBER

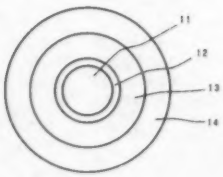
Hiroyuki Tanaka; Takeshi Satake; Toshikazu Gozen; Toshiya Suzaki, and Atsushi Utsumi, all of Itami, Japan, assignors to Mitsubishi Cable Industries, Ltd., Amagasaki, Japan

Filed Jul. 8, 1988, Ser. No. 216,382

Claims priority, application Japan, Jul. 10, 1987, 62-106229[U]; Feb. 26, 1988, 63-44847

Int. Cl.[4] G02B *6/10*

U.S. Cl. 350—96.31 **9 Claims**



1. An energy transmission optical fiber comprising:

a core formed of pure silica containing an OH-group at a content of 500 ppm or more, and having a core refractive index which is constant in a radial direction;

a first clad disposed around said core and having a first refractive index which has a first value at an inner circumferential side which is less than said core refractive index and which gradually decreases in an outward radial direction; and

a second clad disposed around said first clad and having a second refractive index which is constant in a radial direction.

4,893,897

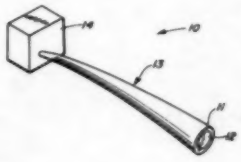
PLASTIC OPTICAL FIBER FOR IN VIVO USE HAVING A BIOCOMPATIBLE POLYURETHANE CLADDING

Theodore L. Parker, Walnut Creek; David R. Pedersen, Clayton, and Jerry D. Moseley, Walnut Creek, all of Calif., assignors to Dow Chemical Company, Midland, Mich.

Filed Mar. 2, 1988, Ser. No. 163,056

Int. Cl.[4] G02B *6/00*

U.S. Cl. 350—96.34 **17 Claims**



1. A flexible optical fiber for in vivo use in the tissue of a living mammal, which optical fiber comprises:

(a) a flexible organic polymeric optical fiber core, and

(b) an adherent flexible organic polymeric cladding selected from a poly(urethane) on the outer surface of the optical fiber core wherein the optical fiber core has a refractive index of at least 0.01 greater than the refractive index of the polymeric cladding.

4,893,898

LOW DIFFERENTIAL 3-D VIEWER GLASSES AND METHOD WITH SPECTRAL TRANSMISSION PROPERTIES TO CONTROL RELATIVE INTENSITIES

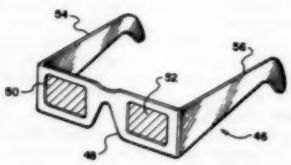
Terry D. Beard, 1407 N. View Dr., Westlake Village, Calif. 91362

Continuation of Ser. No. 154,068, Feb. 9, 1988, Pat. No. 4,836,647. This application Jan. 9, 1989, Ser. No. 294,868

The portion of the term of this patent subsequent to Nov. 10, 2004, has been disclaimed.

Int. Cl.[4] G02B *27/22; G03B 21/32*

U.S. Cl. 350—132 **6 Claims**



1. A 3-D television system for creating a stereoscopic effect when viewing a television image in which at least portions of the image exhibit a lateral movement, comprising:

a television which includes a television screen having a spectral-energy emission characterized by radiant energy peaks at spaced wavebands along the spectrum, and

viewer glasses for viewing said television screen, said viewer glasses comprising:

first means for transmitting light from the television screen to the viewer's left eye,

second means for transmitting light from the television screen to the viewer's right eye,

one of said light transmitting means being lighter than the other light transmitting means and having a spectral transmission characterized by a substantially greater transmissivity at wavelengths corresponding to each of said energy peaks, relative to both its transmissivity at other wavelengths within the visible spectrum and to the transmissivity of the other light transmitting means at said peak

energy wavelengths, whereby the differential in light transmission between said first and second light transmitting means is greater when viewing the television screen than in normal ambient light, and

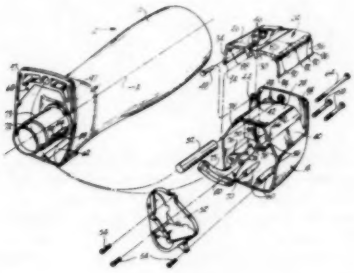
means for holding said first and second light transmitting means in place on a viewer's face in front of his or her respective eyes.

4,893,899

ADJUSTABLE CONTROL MECHANISM FOR OPTICAL INSTRUMENTS

Claus O. Huckenbeck, Tehachapi, Calif., assignor to Bausch & Lomb Incorporated, Rochester, N.Y.

Filed Apr. 15, 1988, Ser. No. 181,989
Int. Cl.[4] G02B 7/02
U.S. Cl. 350—255 18 Claims



1. A control mechanism for slidably positioning an optical component along an optical axis of an optical viewing device, the control mechanism comprising:

a rocker externally mounted on the optical viewing device and rotatable from an intermediate position in both clockwise and counterclockwise directions about an axis substantially parallel to the optical axis;

an actuating pin movable up or down along an essentially fixed upright axis in response to rotation of the rocker, the actuating pin having a lower end spaced from its connection to the rocker; and

an elongated lever arm pivoted on a fixed pivot axis and spaced from the axis of rotation of the rocker, said lever arm having a first end portion on one side of the fixed pivot axis and a second end portion on an opposite side of the fixed pivot axis;

the first end portion of the lever arm being pivotally secured to the lower end of the actuating pin for rotating about said fixed pivot axis in response to movement of the actuating pin;

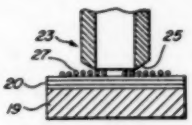
the second end portion of the lever arm having an elongated arcuate sliding connection to a drive pin carried on the optical component, the drive pin being adapted for reciprocating travel along the optical axis of the viewing device, rotation of the first end portion of the lever arm about the pivot axis of the lever arm being translated to arcuate travel of the second end portion of the lever arm about its pivot axis for causing sliding reciprocating travel of the drive pin for slidably positioning the optical component along the optical axis of the viewing device in response to clockwise or counterclockwise rotation of the rocker, the drive pin including means for retaining the sliding connection of the pin to the lever arm during arcuate travel of the second end portion thereof.

4,893,900

METHOD OF ALTERING REFLECTIVITY OF OPTICAL ELEMENTS

Paul F. Robusto, Carlsbad; David D. Scofield, San Diego; Chan H. Wang, Poway, and John C. Hamacher, Vista, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Sep. 20, 1988, Ser. No. 246,709
Int. Cl.[4] G02B 27/00
U.S. Cl. 350—320 19 Claims



1. A method of forming an optical element comprising the steps of:

providing an optical element having a surface of substantially uniform reflectivity; and

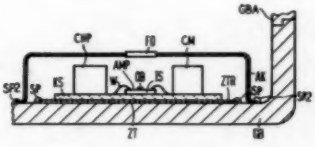
imparting a step function approximation of a taper to said reflectivity.

4,893,901

ELECTRO-OPTICAL ASSEMBLY

Franz Taumberger, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

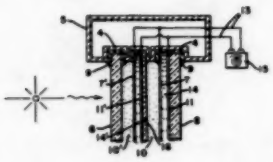
Filed Sep. 20, 1988, Ser. No. 246,798
Claims priority, application Fed. Rep. of Germany, Sep. 25, 1987, 3732391
Int. Cl.[4] G02B 27/00
U.S. Cl. 350—321 12 Claims



1. An electro-optical assembly containing optical components and a film circuit arranged on a substrate, the film circuit having at least one opto-electrical component, the assembly being contained in a sealed housing having a metallic housing floor, comprising:

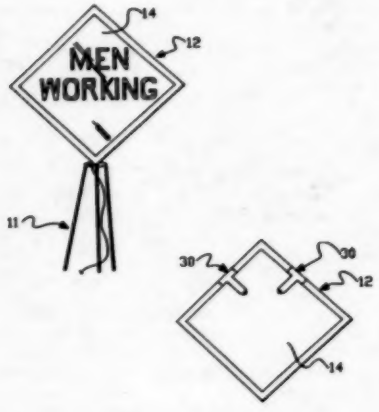
an intermediate carrier secured in large area fashion to the substrate on the surface side of the substrate facing away from the film circuit, said intermediate carrier being composed of a comparatively thin sheet of metal and having an area larger than the substrate, said intermediate carrier including edge strips projecting beyond the substrate along at least two opposite sides, said edge strips being joined to the housing floor by welds.

4,893,902
DUAL-PANE THERMAL WINDOW WITH LIQUID CRYSTAL SHADE
Ray H. Baughman, Morris Plains; Ernest D. Buff, Far Hills; Helmut Eckhardt, Madison, and Gerhard H. Fuchs, Far Hills, all of N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.
Division of Ser. No. 66,299, Jun. 25, 1987. This application May 12, 1989, Ser. No. 350,808
Int. Cl.[4] G02F 1/133; E04C 2/54
U.S. Cl. 350—331 R 2 Claims



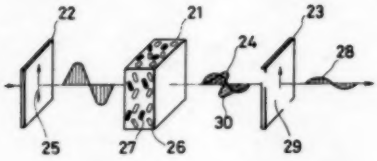
2. A thermal-pane window unit resistant to radiative heat transfer as well as conductive heat transfer, comprising:
(a) a plurality of substantially parallel, spaced window panes, mounted in a window frame;
(b) a plurality of liquid crystal cells, each of said cells being affixed to a different one of said panes; and
(c) a plurality of thermal breaks, each of said thermal breaks being a space delimited between a wall of each of said cells and a face of each of said panes.

4,893,903
FLASHING ADVISORY SIGN
David H. Thakar, Alamo, and Michael N. Thakar, Oakland, both of Calif., assignors to Taliq Corporation, Sunnyvale, Calif.
Continuation-in-part of Ser. No. 731,412, May 6, 1985, abandoned. This application Apr. 28, 1986, Ser. No. 856,356
Int. Cl.[4] G02F 1/13; G09F 9/00
U.S. Cl. 350—331 R 9 Claims



1. For use with a conventional advisory sign having a visible message, and optical shutter device for alternately blocking and transmitting the message, said device comprising:
spacer means attached to the sign in front of the message;
electrically operable optical shutter means coupled to said spacer means for alternately blocking and transmitting light between the message and a viewing region in front of said device; and
hanger means for removably attaching said spacer means to the sign such that said optical shutter means is in front of the message.

4,893,904
LIQUID CRYSTAL LIGHT SHUTTER
Morio Ohta, and Hideaki Inoue, both of Tokyo, Japan, assignors to Casio Computer Co., Ltd. and Casio Electronics Manufac. Co. Ltd., both of Tokyo, Japan
Continuation of Ser. No. 814,797, Dec. 30, 1985, abandoned. This application Jun. 21, 1988, Ser. No. 220,953
Claims priority, application Japan, Feb. 22, 1985, 60-34135
Int. Cl.[4] G02F 1/133
U.S. Cl. 350—337 2 Claims



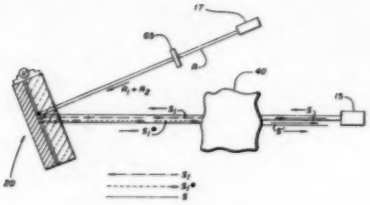
1. A liquid crystal light shutter of the Guest-Host type in combination with and interposed between a light source and a photosensitive body, said shutter comprising:
(a) two substantially transparent plates, each of which has an electrode;
(b) a first polarizing plate located between one of said transparent plates and said light source;
(c) a mixture of a liquid crystal material and a dichroic dye sealed between said two transparent plates, said liquid crystal material behaving as a host, and said dye behaving as a guest, and being wholly responsive to the application of a high frequency signal to said electrodes for effecting homogeneous alignment substantially parallel to the direction of polarization of said first polarizing plate according to the direction of orientation processing of said two plates to prevent transmission of light through the shutter, and being wholly responsive to the application of a low frequency signal to said electrodes for effecting homeotropic alignment substantially perpendicular to said direction of polarization to effect transmission of light through said shutter;
(d) means for applying to said electrodes a signal composed of said high frequency signal and/or said low frequency signal corresponding to recorded information for effecting control of the transmission of light from said source to said photosensitive body only through the absorption of light by said dichroic dye;
(e) means for heating said liquid crystal material for raising its temperature to and holding its temperature at a predetermined level enabling high speed operation of the shutter; and
(f) a second polarizing plate located between the other of said plates and said photosensitive body, and having a direction of polarization substantially parallel to that of said first polarizing plate for the purpose of interrupting light which is transmitted through said mixture and is not absorbed by said dichroic dye due to a misalignment of said homogenous orientation of said liquid crystal material and said dichroic dye for improving the contrast capabilities of said liquid crystal shutter, the last mentioned light transmitted through said mixture being caused by a greater shift in homogeneous orientation at said predetermined level of temperature.

4,893,905

OPTICAL LIGHT VALVE SYSTEM FOR PROVIDING PHASE CONJUGATED BEAM OF CONTROLLABLE INTENSITY

Uzi Efron, Los Angeles, and Yuri Owechko, Newbury Park, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jun. 10, 1988, Ser. No. 204,646
Int. Cl.[4] G02F 1/133, 1/135, 1/01
U.S. Cl. 350—338 11 Claims



1. An optical light valve system comprising:

means for providing a coherent signal beam of a first polarization state;

means for providing a coherent reference beam having a first component of said first polarization state and a second component of a second polarization state; and

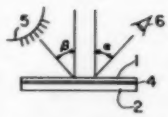
light valve means for phase conjugating said second component of said reference beam in response to said signal beam.

4,893,906

DISPLAY FORMS USING LIQUID CRYSTALS

David M. Makow, 14 Davidson Crescent, Gloucester, Ontario, Canada K1J 6M2

Filed Mar. 9, 1988, Ser. No. 165,821
Claims priority, application Canada, Mar. 17, 1987, 532251
Int. Cl.[4] G02F 1/133; C09K 19/00
U.S. Cl. 350—350 R 15 Claims



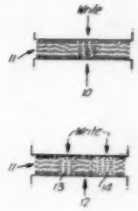
1. A display device comprising a light source, a panel with an interior and exterior surface, said exterior surface exposed to an onlooker and being on the reverse side of said panel, relative to said internal surface, at least a portion of said panel being coated with a liquid crystal coating which has a melting point above its operating temperature, and which is perceived as changing colour with a change in the angle between the line from said onlooker to a point which is viewed on the said exterior surface of said panel and the said exterior surface, or with the change in the angle between a line from said light source to a point on said exterior surface which is being viewed and a said exterior surface.

4,893,907

OPTICAL DEVICES

Stephen R. Mallinson, Ipswich, England, assignor to British Telecommunications Public Limited Company, United Kingdom

PCT No. PCT/GB87/00217, § 371 Date Nov. 30, 1987, § 102(e) Date Nov. 30, 1987, PCT Pub. No. WO87/06019, PCT Pub. Date Oct. 8, 1987
PCT Filed Mar. 31, 1987, Ser. No. 130,462
Claims priority, application United Kingdom, Apr. 4, 1986, 8608276
Int. Cl.[4] G02F 1/13
U.S. Cl. 350—350 S 23 Claims



1. A liquid crystal device having smectic A phase liquid crystal material in only two transparent states of differing molecular orientation, which present differing respective refractive indices to polarised light transmitted through the device;

the smectic A phase liquid crystal material in one transparent state having a molecular orientation substantially orthogonal to the material in the other transparent state; and

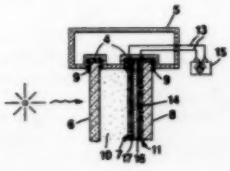
the liquid crystal material being interposed between two major bounding surfaces the orientation in one state being homogeneous and substantially parallel to the major bounding surfaces and the orientation in the other state being homeotropic and substantially orthogonal to the major bounding surfaces.

4,893,908

ADJUSTABLE TINT WINDOW WITH ELECTROCHROMIC CONDUCTIVE POLYMER

James F. Wolf, Dover; Granville G. Miller, Morristown; Lawrence W. Shacklette, Maplewood; Ronald L. Elsenbaumer, Morris Township, Morris County, and Ray H. Baughman, Morris Plains, all of N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Jun. 27, 1988, Ser. No. 211,537
Int. Cl.[4] G02F 1/17, 1/25
U.S. Cl. 350—357 24 Claims



1. A method for decreasing radiative heat transfer and adjustably limiting visible light and near infrared radiation transfer ad glare through a window, comprising the steps of: (a) mounting within a frame of said window a plurality of spaced window panes, a first and second of said panes having oppos-

ing faces; (b) assembling between said opposing faces a conductive polymer cell, said cell having a first wall composed of a transparent conductive layer affixed to said first pane and having deposited thereupon an electroactive electro-optically responsive conductive polymer composed of either p-type or n-type conjugated polymers and a second wall comprised of a transparent conductive layer coated on said second pane, said layer being optionally coated with a second electro-optically responsive conductive polymer, said conjugated polymers being chain-oriented in a plane parallel to the plane of the window so as to create a polarization of the transmitted light, said first and second walls delimiting a cavity containing an ion-conducting electrolyte which contacts opposing surfaces of the first and second walls, and (c) applying a potential between said first and second walls to provide a selected light transmittance upon passage of current therebetween.

4,893,909

MAGNETO-OPTICAL LIGHT SWITCHING ELEMENT AND METHOD OF MANUFACTURING SAME

Peter Hansen, Appen; Claus-Peter Klages, Hamburg; Klaus-Peter Schmidt, Quickborn; Wolfgang F. M. Tolksdorf, Tornesch, and Klaus Witter, Hamburg, all of Fed. Rep. of Germany, assignors to U.S. Philips Corp., New York, N.Y.

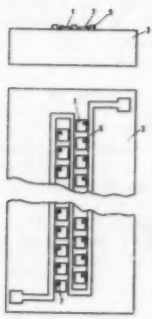
Filed Mar. 3, 1987, Ser. No. 21,109

Claims priority, application Fed. Rep. of Germany, Mar. 6, 1986, 3607346

The portion of the term of this patent subsequent to Sep. 13, 2005, has been disclaimed.

Int. Cl.[4] G02F *1/01*; G02B *5/30*

U.S. Cl. 350—377 **18 Claims**



1. A magneto-optical light switching element comprising:

a magnetically unordered, optically transparent, (100)-oriented garnet substrate;

a plurality of islands formed from an epitaxial layer on said substrate, said layer formed on the basis of bismuth-substrated rare earth metal iron garnet;

a plurality of integrated heating resistors disposed on said plurality of islands; and

an integrated coil formed on said substrate having turns which surround and are proximate to said islands, said integrated coil generating a magnetic flux which in combination with the heat produced by said heating resistors, controls light passage through said islands.

4,893,910

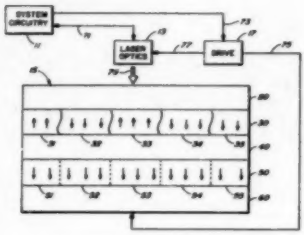
MAGNETO-OPTICAL RECORDING SYSTEM HAVING MEDIUM WITH DOMAINLESS CONTROL LAYER

Henryk Birecki, Palo Alto, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Mar. 16, 1988, Ser. No. 168,710

Int. Cl.[4] G02F *1/29*

U.S. Cl. 350—377 **24 Claims**



1. A system comprising:

a medium having distributed optical and thermal properties, said medium including a magneto-optical storage layer and a magnetic control laser, said medium having a predetermined ambient temperature range;

said storage layer having at least one domain which can alternatively acquire a first magnetic orientation and a second magnetic orientation,

said control layer having a control layer Curie temperature, said control layer including a region the temperature of which determines the magnitude and direction of a magnetic field applied at said domain so as to define a zero-net-field temperature at which said field has substantially zero magnitude, said field having an initial direction when said region is between said ambient temperature range and said zero-net-field temperature, said zero-net-field temperature being above said ambient temperature range and below said control layer Curie temperature, said field having an inverted direction when said region is between said zero-net-field temperature and said control layer Curie temperature;

said distributed optical and thermal properties being selected so that there exists:

a first laser beam type that when directed toward said domain causes said domain to be heated to a first peak domain temperature and causes said region to be heated to a first peak region temperature above said zero-net-field temperature and below said control layer Curie temperature so that said domain cools through its switching temperature before said region cools through its zero-net-field temperature, and

a second laser beam type that when directed toward said domain causes said domain to be heated to a second peak domain temperature and causes said region to be heated to a second peak temperature above said zero-net field temperature and below said first peak region temperature so that said domain cools through its switching temperature after said region cools through its zero-net-field temperature.

4,893,911

POLARIZERS BASED ON POLYACETYLENE, AND THE PRODUCTION THEREOF

Karl-Heinz Ostoja-Starzewski, Bad Vilbel; Josef Witte, Cologne, and Uwe Claussen, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Apr. 30, 1987, Ser. No. 44,330

Claims priority, application Fed. Rep. of Germany, May 10, 1986, 3615765

Int. Cl.[4] G02B *5/30*; B29D *11/00*

U.S. Cl. 350—398 20 Claims

18. Polarizers which comprise a polymer matrix with polyacetylene homogeneously distributed therein as a light-polarizing substance.

4,893,912

DEVICE FOR OBSERVING A HOT REACTION SPACE IN THE INTERIOR OF A REACTOR OPERATING AT INCREASED PRESSURE

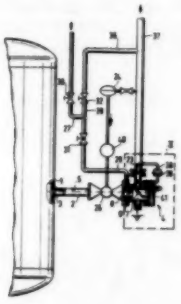
Klaus Köhnen, Mühlheim/Ruhr; Hans Niermann, and Lothar Semrau, both of Essen, all of Fed. Rep. of Germany, assignors to Krupp Koppers GmbH, Essen, Fed. Rep. of Germany

Filed Nov. 7, 1985, Ser. No. 796,391

Claims priority, application Fed. Rep. of Germany, Nov. 13, 1984, 3431346

Int. Cl.[4] G02B *23/08*

U.S. Cl. 350—506 3 Claims



1. A device for observing a hot reaction space in the interior of a reactor operating at an increased pressure, comprising: a tubular housing having an inlet portion for communicating with an observation opening in the reactor, an intermediate portion enclosing a reflecting mirror inclined at an angle to light rays passing through the observation opening, and a closed rear portion; a transverse tubular viewing piece communicating at one end thereof with the intermediate portion opposite said inclined reflecting mirror to receive the reflected light rays; a glass prism sealingly mounted in said inlet portion to separate said intermediate portion from the pressurized interior of the reactor; and another glass prism sealingly mounted at a second end axially opposite the end communicating with the intermediate portion of the tubular housing; and further comprising a transverse pressure relieving tubular piece communicating with said intermediate portion, and being provided with a rupture plate.

4,893,913

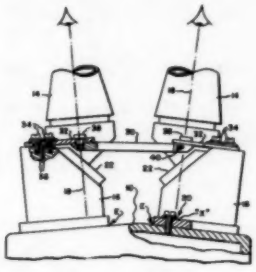
STEROMICROSCOPE HAVING STABILIZER FOR PREVENTING TIPPING OF EYEPIECE ASSEMBLIES

James A. Clark, Honeoye Falls, and Henry J. Emmel, Rochester, both of N.Y., assignors to Cambridge Instruments Inc., Buffalo, N.Y.

Filed Mar. 23, 1987, Ser. No. 28,858

Int. Cl.[4] G02B *21/22*

U.S. Cl. 350—515 4 Claims



1. An optical instrument having stereo vision, comprising:

a. a housing having supported therein a pair of optical systems each being aligned along a separate optical axis;

b. a pair of pivot plates each being spring biased to said housing at a pivot point so as to be rotatable about one of said optical axes, each pivot plate having mounted thereto an eyepiece assembly having an optical axis offset from , but parallel to, one of said optical axes and a mirror assembly for directing light rays along said optical axes through said eyepiece assemblies; and

c. link means spaced from said housing and coupling said pivot plates to prevent tipping of said pivot plates with respect to said housing as the eyepiece assemblies are rotated to thereby accommodate for variations in interpupillary distance.

4,893,914

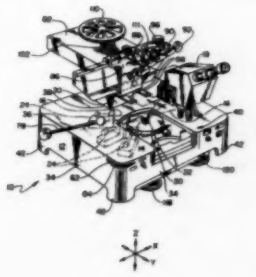
TEST STATION

Robert D. Hancock; Kenneth F. Hollman, and Gene A. Porter, all of Carson City, Nev., assignors to The Micromanipulator Company, Inc., Carson City, Nev.

Filed Oct. 12, 1988, Ser. No. 256,672

Int. Cl.[4] G02B *21/26*, *21/32*

U.S. Cl. 350—530 17 Claims



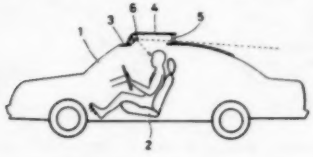
14. A test station comprising:

a base;

a movable frame supported on said base for rectilinear vertical motion;

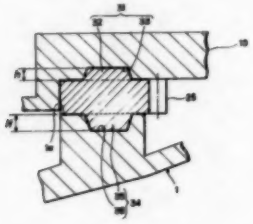
a microscope supported on said frame;
a stage supported on said frame; and
means for effecting rectilinear vertical motion of said frame so that said microscope and said stage can be moved in said rectilinear vertical motion without movement relative to one another, thereby permitting said frame to be moved vertically relative to said objects on said base while objects supported on the stage remain in focus for purposes of viewing through said microscope during said rectilinear motion of said frame.

4,893,915
BACK MIRROR DEVICE FOR VEHICLE
Kunito Tagawa, 2361 East Manoa Rd., Honolulu, Hi. 96822
Filed Oct. 18, 1988, Ser. No. 259,057
Int. Cl.[4] G02B 5/08
U.S. Cl. 350—606 **1 Claim**



1. A back mirror device in a vehicle comprising a rectangular, upwardly projecting housing elongate in the width direction of the vehicle and provided as a portion of the ceiling of the vehicle slightly ahead of a front seat, a transparent window provided at the rear end of said upwardly projecting housing, and a mirror means for reflecting images received through said window to an occupant of the front seat, said mirror means consisting entirely of a transversely elongate back mirror provided on the inner side of a front wall of said upwardly projecting housing and capable of angle adjustment in the vertical and lateral directions said mirror being positioned for reflecting images received through said window directly to the occupant of the front seat when the occupant looks into the mirror.

4,893,916
AUTOMATICALLY STORED VEHICLE MIRROR
Toranoosuke Sakuma, and Hiroyuki Saitoh, both of Shizuoka, Japan, assignors to Koito Seisakusho Co., Ltd., Tokyo, Japan
Filed Feb. 10, 1988, Ser. No. 154,647
Claims priority, application Japan, Feb. 10, 1987, 62-27230
Int. Cl.[4] G02B 5/08, 7/18; B60R 1/06
U.S. Cl. 350—637 **6 Claims**



1. An electrically and manually operable exterior storage type mirror for a vehicle comprising:
a base for mounting said storage type mirror to a body of said vehicle;
a mirror housing rotatably coupled to said base;
a transmission gear rotatably coupled to said base and provided between said base and said mirror housing;
a first clutch means provided between one surface of said transmission gear and said mirror housing, said first clutch means comprising convex parts on said one surface of said transmission gear, concave parts on said mirror housing engaging with said convex parts and spring means for causing said convex and concave parts to be in resilient engagement;
a second clutch means provided between another surface of said transmission gear and said base, said second clutch means having an engaging force greater than an engaging force of said first clutch, said second clutch means comprising convex parts on said another surface of said transmission gear, concave parts on said base engaging with said convex parts and spring means for causing said convex and concave parts to be in resilient engagement; and
a means fixed to said mirror housing and provided within said mirror housing for rotating said transmission gear when electric power is applied to said means; and
wherein the height of said convex parts of said first clutch is less than a height of said convex members of said second clutch.

4,893,917
FRAME STRUCTURE FOR GLASSES HAVING AN EXCELLENT RESTORABILITY
Kenji Ebata, Tokyo, Japan, assignor to Nikon Corporation, Tokyo, Japan
Filed Mar. 21, 1988, Ser. No. 171,379
Claims priority, application Japan, Mar. 27, 1987, 62-45368[U]
Int. Cl.[4] G02C 5/14, 5/16, 5/02
U.S. Cl. 351—41 **13 Claims**

1. A frame structure for eyeglasses, comprising:
a pair of rims adapted to support respective lenses,
a bridge interposed between said rims and connecting said rims to one another,
a pair of temple members, and
a pair of resilient metal wire means for connecting said pair of temple members to said pair of rims, respectively,
each of said resilient metal wire means being of arcuate shape extending alongside a periphery of the corresponding rim and having opposite end parts secured to the periphery of said rim and an intermediate part spaced outwardly from said rim,
each of said temple members being secured to said intermediate part of the corresponding resilient metal wire means.

4,893,918

CONTACT OR INTRAOCULAR LENS FROM LIGHTLY CROSSLINKED POLYMER OR COPOLYMER OF 2-HYDROXYETHYL METHACRYLATE AND A METHOD FOR PRODUCING THEREOF

Jiri Sulc, and Zuzna Krcova, both of Prague, Czechoslovakia, assignors to Ceskoslovenska Akademie Ved, Prague, Czechoslovakia

Filed Jan. 6, 1988, Ser. No. 141,622
Claims priority, application Czechoslovakia, Jan. 12, 1987, 215-87
Int. Cl.[4] G02C 7/04
U.S. Cl. 351—160 H 3 Claims

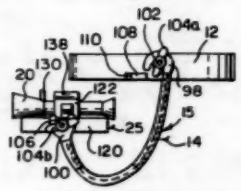
1. A method for producing a contact or intraocular lens comprising treating a shaped lens comprised of a lightly crosslinked 2-hydroxyethyl methacrylate polymer or a lightly crosslinked 2-hydroxyethyl methacrylate copolymer in which at least 50 percent of the monomer units are 2-hydroxyethyl methacrylate units, and the remaining monomer units are of non-hydrophilic comonomer, with an alkaline-reacting solution of a salt which will not cause the lens to swell for a time sufficient to form a hydrophilic-swellable and transparent partially saponified portion on said lens, and subsequently freeing the lens of all soluble substances by washing.

4,893,919

HEAD SUPPORTED OPTICAL SUSPENSION SYSTEM

Edmund Nightingale, 3314 Steuben Ave., Bronx, N.Y. 10467

Filed Apr. 21, 1988, Ser. No. 184,188
Int. Cl.[4] A61B 3/10; G02C 1/00
U.S. Cl. 351—205 22 Claims



1. A head supported optical suspension system which comprises:

(a) an endless annular headband for engaging around head of a person above ears;

(b) a suspension unit dependent on each side of said headband substantially extending downward and forward the ears of the person;

(c) a support frame assembly attached to said suspension unit so that said support frame assembly is adjacent eyes of the person; and

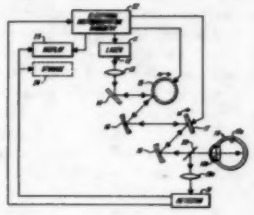
(d) an optical device carried in said support frame assembly, said optical device includes eyepieces to be placed close to the eyes of the person for viewing therethrough, so that hands of the person are free to do other work and all hand tremors, which are magnified by the optical power of said optical device are eliminated, said optical device further comprising a first connector attached to front of said headband, a front flexible tube attached at one end to said front connector, a second connector attached to said front flexible tube and contacts center of said optical device, a plurality of stiffening rods extending through said front flexible tube so that said optical device can further be supported and adjusted therefrom.

4,893,920

OPTICAL SCANNING SYSTEM AND METHOD INCLUDING CORRECTION FOR CROSS SCAN ERROR

Robert H. Webb, Lincoln, Mass., assignor to Eye Research Institute of Retina Foundation, Boston, Mass.

Filed Aug. 9, 1988, Ser. No. 229,990
Int. Cl.[4] A61B 3/10
U.S. Cl. 351—221 13 Claims



1. An optical scanning system for scanning an object through an objective lens comprising,

a laser source for generating a beam of laser light,

an anamorphic beam shaping element placed to intercept said laser beam and provide a specific asymmetrical cross sectional shape to said laser beam,

a first scanning element in the form of a rotating polygon having a plurality of reflecting facets positioned to receive said laser beam from said beam shaping element and scan said beam along a first coordinate;

a second scanning element positioned to receive said laser beam from said first scanning element and scan it along a coordinate normal to said first coordinate onto said objective lens to a focus on said object;

a spherical mirror and lens characterized by a first focal length and position on the optical axis of said system in a plane normal to the axis of said system to focus light impingement upon it onto said objective lens,

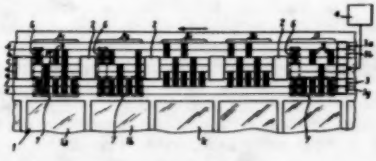
an anamorphic focusing element positioned between said first scanning element and said second scanning element, said anamorphic focusing element having a focal length along said first coordinate such that it focuses the image along the first coordinate from said first scanning element at approximately the plane of said second scanning element, said anamorphic focusing element having a focal length along said second coordinate such that it focuses the image of said first scanning element at a point substantially beyond the plane of said second scanning element.

4,893,921

PROCESS FOR RECORDING CODED INFORMATION ON THE MARGINAL PART OR A PERFORATED CINEMATOGRAPHIC FILM

Jean-Pierre Beauviala, Grenoble, France, assignor to AATON R.G., Grenoble, France

Filed Oct. 12, 1988, Ser. No. 256,869
Claims priority, application France, Oct. 30, 1987, 87 15098
Int. Cl.[4] G03B 21/50
U.S. Cl. 352—92 1 Claim



1. A process for recording, on the marginal part of a perfo-

rated cinematographic film, coded information or "addresses" associated respectively with the various images of the film, in the form of dots disposed in a matrix of longitudinal rows and of transverse columns, in which, before each matrix of dots corresponding to a group of coded information or "address" of an image, a transverse framing pattern constituted by a single combination of dots, is recorded, then, during the recording, in the different transverse columns, of the different successive characters constituting the same "address", a longitudinal framing pattern is recorded, along a longitudinal row bordering the matrix, this longitudinal framing pattern being constituted by an alternation, along said row, of dots and absences of dots aligned respectively with the various transverse columns of the matrix, the dots being recorded on the film by means of a recording device constituted by a transverse assembly of adjacent light sources illuminating the film respectively at the location of each longitudinal row,

wherein, in order to form the dots on the film, the light sources are energized by pairs of adjacent sources so as to form on the film, for each element of information, a transverse dot occupying the location of two longitudinal rows, in other words having a length of a pitch corresponding to the total width of two adjacent rows, and the successive groups of information or "addresses" are recorded, offsetting them alternately by a half-pitch in the transverse direction.

4,893,922

MEASUREMENT SYSTEM AND MEASUREMENT METHOD

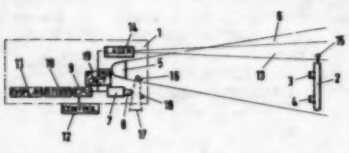
Kurt Eichweber, Hamburg, Fed. Rep. of Germany, assignor to Precitronic Gesellschaft fur Feinmechanik und Electronic mbH, Hamburg, Fed. Rep. of Germany

Continuation of Ser. No. 935,741, Nov. 28, 1986, abandoned. This application Dec. 23, 1988, Ser. No. 291,377

Claims priority, application Fed. Rep. of Germany, Jul. 9, 1986, 3623083

Int. Cl.[4] G01C *3/22*; B25J *19/00*; H04N *7/18*

U.S. Cl. 356—1 **15 Claims**



1. A system for the measurement of a target object, comprising:

first and second retroreflectors carried by the object with a known spacing therebetween, each retroreflector adapted to return substantially all of any light impinging thereon from a light source;

a measuring device including a light including

a light source for projecting a single light beam onto both of the retroreflectors from a source location,

a matrix CCD video camera at the source location oriented to receive first and second reflected source light beams from the first and second retroreflectors and to generate respective first and second image points,

means for analyzing the distance relationship of the first and second image points in the camera to determine the measurement attributes of at least location of the object relative to the source location, and

means for transmitting information from the measuring device to the object.

4,893,923

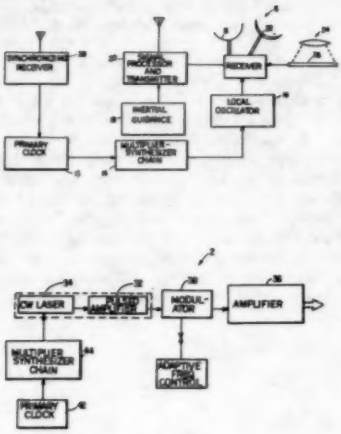
DOPPLER LASER RADAR SYSTEM

Ali Javan, Cambridge, Mass., assignor to Laser Science, Inc., Cambridge, Mass.

Filed Oct. 6, 1986, Ser. No. 915,650

Int. Cl.[4] G01P *3/36*; G01C *3/08*

U.S. Cl. 358—28.5 **59 Claims**



1. In a laser radar-Doppler system for detecting remote targets each independently capable of generating a return signal when illuminated by a laser beam, the combination comprising

a laser transmitter including

means for transmitting a pulsed target-illuminating laser beam having a beamwidth selected so that said beam is capable of simultaneously illuminating a plurality of said targets,

a reference oscillator, and

first stabilizing means for maintaining a predetermined relationship between the frequency of said oscillator and the frequency of said illuminating beam, and

a plurality of spaced receiver modules separate from said transmitter and each including

means for receiving the return laser beam from at least one of said targets,

a local oscillator,

second stabilizing means independent of said first stabilizing means for precisely controlling the frequency of said local oscillator to bear a predetermined fixed relationship with the frequency of said reference oscillator in said transmitter, and

means for comparing the frequency of the return laser beam with the frequency of said local oscillator.

4,893,924

METHOD OF REMOTELY DETECTING SUBMARINES USING A LASER

Donald A. Leonard, Cupertino, and Harold E. Sweeney, Menlo Park, both of Calif., assignors to GTE Government Systems Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 64,375, Jun. 22, 1987, Pat. No. 4,867,558. This application Jul. 20, 1988, Ser. No. 222,598

Int. Cl.[4] G01J *5/00*

U.S. Cl. 356—43 **23 Claims**

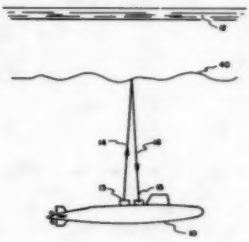
1. An underwater method of detecting the wake of a first

submerged submarine from a second submerged submarine comprising the steps of:

generating from within said second submarine a pulsed laser beam;

directing said beam upwardly from said second submarine with an intensity sufficient to penetrate the thermocline of said water;

detecting in said second submarine the Rayleigh and Brillouin backscatter light components produced by the interaction of said beam with said water;



mixing said Rayleigh and Brillouin light components and thereby producing a heterodyne signal having a frequency f_B;

periodically converting the heterodyne signal into a temperature/depth profile; and

translating said temperature/depth profile into spatial patterns for comparison with patterns characteristic of the wake of a moving submarine.

4,893,925

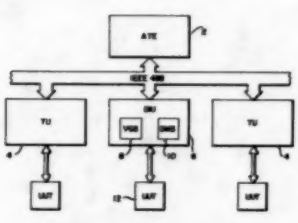
OPTICAL MEASUREMENT SYSTEM FOR A DISPLAY INTERFACE UNIT

Kevin T. Sweeney, Hicksville; Joseph P. Mattal, Smithtown; Mitchell L. Kushner, Bayside, and Robert H. Lemke, Huntington Station, all of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed May 26, 1988, Ser. No. 199,075

Int. Cl.[4] H04N *17/04*; G01N *21/84*

U.S. Cl. 356—72 **20 Claims**



1. Apparatus for evaluating optical characteristics provided by a stationary display unit under test, comprising:

means for sensing optical characteristics of the viewing area of the display unit, the sensing means having a field of view and a plurality of detectors resident within the field of view responsive to the optical characteristics;

focus means interposed between the display unit and the sensing means;

means for positioning the sensing means relative to the focus means along three directions such that any to be evaluated portion of the viewing area of the display unit can be chosen and projected onto the field of view of the sensing means;

whereby the optical characteristics of any chosen to be evaluated portion are measured by the detectors and evaluated by prestored image processing algorithms to determine the optical performance of the display unit.

4,893,926

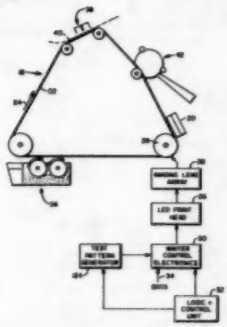
FOCUSING FOR OPTICAL PRINT HEADS

Roger L. Willis, Churchville, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 23, 1987, Ser. No. 29,117

Int. Cl.[4] G06K *15/12*; G03G *15/04*

U.S. Cl. 356—123 **7 Claims**



1. In a device for generating printed output having an array of light sources focused across a photoresponsive surface such that there exists a predetermined distance between the surface and the light sources whereat best focus is obtained, the improvement being apparatus for locating the array substantially at the position of best focus comprising:

means for activating selected ones of the light sources along the array such that a desired pattern of activated and unactivated light sources results, said pattern being such that pairs of light sources which lead to the creation of an image on the output are separated by a light source which does not lead to the creation of an image, whereby the width of the space between the two marks provides an indication of the degree of focus of the light sources on the photoresponsive surface; and

means for adjustably mounting the light sources on the device for movement relative to the photoresponsive surface such that the light sources can be moved toward and away from the surface to a position of best focus.

4,893,927

METHOD AND APPARATUS FOR ALIGNING A ZOOM LENS WITH AN IMAGE SENSOR

Martin L. Miller, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 3, 1989, Ser. No. 292,803

Int. Cl.[4] G01B *9/00*

U.S. Cl. 356—127 **9 Claims**

1. A method of aligning the optical axis of a zoom lens with an optical center of an image sensor comprising:

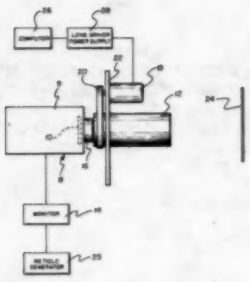
capturing an image of a target having a pattern with the image sensor;

moving said lens between different states of magnification;

displaying the pattern image on a screen while moving said lens;

observing said pattern during said lens movement;

identifying a stationary portion of said pattern image during such observation; and



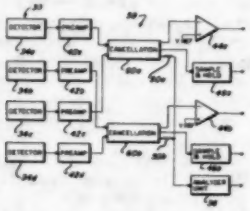
adjusting said lens relative to the image sensor to cause the stationary portion to coincide with the optical center of the sensor.

4,893,928

HIGHLY SENSITIVE PARTICLE SIZE DETECTION DEVICE HAVING NOISE CANCELLATION

Robert G. Knollenberg, Boulder, Colo., assignor to Particle Measuring Systems, Inc., Boulder, Colo.

Continuation-in-part of Ser. No. 851,477, Apr. 14, 1986, Pat. No. 4,798,465. This application Sep. 13, 1988, Ser. No. 243,988
Int. Cl.[4] G01N *15/02, 21/53*
U.S. Cl. 356—336 15 Claims



1. In a particle size detection device having first means for enabling a medium having particles therein to be passed through a predetermined sensing region and second means for illuminating said sensing region so that particles in said sensing region cause light scattering, an improved particle sensing system comprising:

detecting means for receiving and detecting light scattered at said sensing region, said detecting means including a plurality of detectors positioned so that predetermined ones of said detectors receive light scattered from predetermined portions of said sensing region, with said predetermined portions of said sensing region being spaced with respect to one another, and with each of said detectors providing an output that can include both noise and signals indicative of sensed light scattered by particles within said predetermined portion of said sensing region monitored by that detector; and

processing means including noise cancellation means connected with said predetermined ones of said detectors, said noise cancellation means causing noise included in said outputs from said predetermined ones of said detectors to be substantially cancelled so that the output from said processing means is effectively indicative of said particles causing said light scattering in said sensing region.

4,893,929

PARTICLE ANALYZING APPARATUS

Moritoshi Miyamoto, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 8, 1988, Ser. No. 165,497
Claims priority, application Japan, Mar. 13, 1987, 62-58301; Jun. 12, 1987, 62-146656
Int. Cl.[4] G01N *15/02, 21/53*
U.S. Cl. 356—336 4 Claims

1. A particle analyzing apparatus comprising:

irradiating means for applying a light beam to a particle to be examined flowing through an observation portion;

a plurality of light detecting means for respectively detecting intensities of a plurality of components of scattered light emitted from said particle to be examined at the same moment and which differ in scattering angle;

correcting means for multiplying outputs of said plurality of light detecting means by correction coefficients and adding them together and providing an output value; and

operation means for calculating the particle diameter of said particle to be examined from the output value of said correcting means;

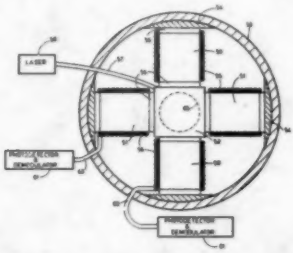
the output value of said correcting means and said particle diameter being in the relation of 1 to 1.

4,893,930

MULTIPLE AXIS, FIBER OPTIC INTERFEROMETRIC SEISMIC SENSOR

Steven L. Garrett, Pebble Beach, and David L. Gardner, Monterey, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 25, 1988, Ser. No. 147,968
Int. Cl.[4] G01B *9/02*
U.S. Cl. 356—345 3 Claims



3. A mechanical vibration sensor comprising:

a seismic mass;

an even-numbered plurality of at least four resilient supports connected to said seismic mass and spaced in predetermined angular relation, said resilient supports being disposed in pairs with such resilient supports of each pair disposed oppositely of said seismic mass;

a plurality of lengths of optical fiber equal in number to the number of resilient supports and wound individually thereabout; and

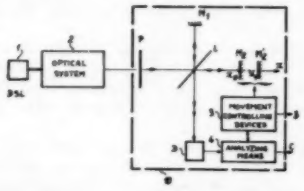
an enclosure surrounding said seismic mass and said plurality of resilient supports and connected to each of said supports so as to support said seismic mass therebetween.

4,893,931

METHOD FOR THE DETECTION OF POLARIZATION COUPLINGS IN A BIREFRINGENT OPTICAL SYSTEM AND APPLICATION OF THIS METHOD TO THE ASSEMBLING OF THE COMPONENTS OF AN OPTICAL SYSTEM

Hervé Lefevre, Paris; Jean P. Bettini, Perthes, and Serge Botti, Viroflay, all of France, assignors to Thomson-CSF, Paris, France

Filed Mar. 10, 1988, Ser. No. 166,492
Claims priority, application France, Mar. 13, 1987, 87 03459
Int. Cl.[4] G01B 9/02
U.S. Cl. 356—351 **8 Claims**



1. An apparatus for detecting and locating localized polarization couplings in a birefringent optical system comprising:

a light source for entering polarized light into a birefringent optical system;

a polarizer, placed in non-alignment with the birefringent axis of said optical system, for receiving light emerging from said optical system;

an interferometer placed after said polarizer and for receiving the polarized light output of said polarizer, having two optical paths, with one of said paths having a variable length, and with a means for interference analysis of the optical system;

means for varying the length of said variable optical path in response to the abscissa z of an analyzed point of the optical system;

means in said interference analyzing means for analyzing fringes caused by the variation of the variable length optical path; and

means for determining the contrast of said fringes, which is related to the level of coupling at the point of the abscissa z, being known from the difference in the lengths of the optical paths.

4,893,932

SURFACE ANALYSIS SYSTEM AND METHOD

Robert G. Knollenberg, Boulder, Colo., assignor to Particle Measuring Systems, Inc., Boulder, Colo.

Continuation of Ser. No. 859,054, May 2, 1986, abandoned. This application Oct. 21, 1988, Ser. No. 262,216
Int. Cl.[4] G01N 21/01
U.S. Cl. 356—369 **21 Claims**

1. A surface analysis system, comprising:

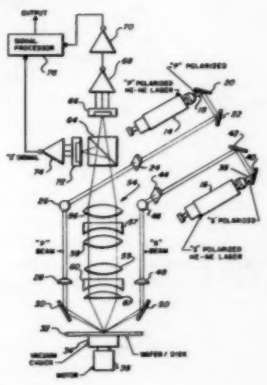
beam generating means for providing first and second illuminating beams having predetermined different polarizations;

beam directing means for directing said beams to a monitoring region;

support means for supporting a material having a surface to be analyzed for the presence of submicron particles on and below said surface with said surface being positioned at said monitoring region so that said beams impinge on said surface in a manner such that light is scattered by contamination and defects on and below said surface due to the presence of said submicron particles;

collecting means for collecting intensities of said light scattered by said contamination and defects on and below said surface;

separating means for separating said intensities of scattered light collected by said collecting means into first and second components with said first component including intensities of scattered light from said first beam and said second component including intensities of scattered light from said second beam;



first and second detecting means, said first detecting means receiving said first component of scattered light intensities from said separating means and said second detecting means receiving said second component of scattered light intensities from said separating means, said first and second detecting means, responsive to receipt of said components of scattered light intensities, providing separate outputs indicative thereof; and

processing means for receiving said outputs from said detecting means and utilizing the same to provide an output indicative of said submicron particles on and below said surface.

4,893,933

AUTOMATIC BOF VESSEL REMAINING LINING PROFILER AND METHOD

Gary L. Nethetsel, Cincinnati; Karl T. Bagdal, Middletown; Bradley R. Hoover, Hamilton, and Robert H. Jacks, Middletown, all of Ohio, assignors to Armco Inc., Middletown, Ohio

Filed Sep. 30, 1987, Ser. No. 103,069
Int. Cl.[4] G01B 11/02
U.S. Cl. 356—376 **27 Claims**

1. Inspection apparatus for use with a refractory lined vessel of the type having bottom, sides and an open top, the interior walls of said lining being subject to wear and generally at a temperature substantially higher than ambient, said inspection apparatus being configured to measure the actual remaining lining thickness and including:

a. inspection means comprising:

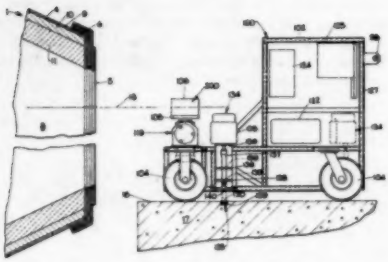
i. a laser transmitter for directing a laser light beam toward the interior vessel wall through the vessel opening;

ii. a receiver for detecting the laser light beam scattered from the interior vessel wall comprising a linear array receiver having a plurality of optical elements positioned in side-by-side relationship;

iii. means for automatically directing the laser beam sequentially at a plurality of predetermined points on the

interior vessel wall comprising a preselected area less than the entire area of the interior vessel wall;

iv. means for correlating the displacement of the detected laser light beam with respect to said optical elements with the actual remaining lining thickness at each of



said points within the preselected area of the interior vessel wall; and

v. means for accurately and repeatably positioning said inspection means at a predetermined fixed location externally of and adjacent to said vessel.

4,893,934

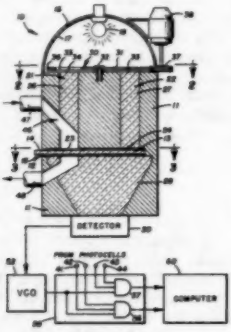
AETHALOMETER

Anthony D. Hansen, Berkeley, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jan. 25, 1988, Ser. No. 148,328

Int. Cl.[4] G01N *21/01, 21/59*

U.S. Cl. 356—434 **5 Claims**



1. An improved aethalometer comprising:

a housing having a slot for the reception of a light transmitting filter,

a single light source secured against movement relative to said housing,

a single light detector secured against movement relative to said housing,

means forming first and second light paths through said housing for the transmission of light from said light source to said light detector, said first and second light paths passing through first and second separate areas of a filter disposed in said slot, said means including first and second separate solid light-transmitting solid members disposed in said first and second light paths respectively between said light source and said slot, said first and second solid members each having an end disposed for reception of light from said light source,

shutter means for allowing light from said light source to pass alternately through said light paths and alternately solely through one of said first and second areas of a filter disposed in said slot while completely blocking light from said light source from passing through the other of said first and second areas of said filter, said shutter means including an opaque member disposed between said light source and said ends of said first and second light-transmitting solid members said opaque member having an opening therethrough, and means for moving said opaque member in a path of movement between a first position wherein said end of said first light-transmitting solid member is completely exposed through said opening to light from said light source and said end of said second light-transmitting solid member is completely blocked from said light, and a second position wherein the exposure and blocking of said ends of said light-transmitting solid members is re[illegible]sed,

a first pair of photocells associated with said end of said first light-transmitting solid member, said photocells being fixed to said housing and on opposite sides of said first solid member end along said path of movement of said opaque member,

a second pair of photocells associated with said end of said second light-transmitting solid member, said photocells being fixed to said housing and on opposite sides of said second solid member end along said path of movement of said opaque member,

said opening of said opaque member being greater in size than either of said ends of said first or second light-transmitting solid members and the photocells associated therewith,

means forming a flow path for passage of gas through said housing, said flow path allowing gas to pass through one only of said first and second areas of a filter disposed in said slot,

a single generating means for generating signals proportional to the magnitude of light received by said light detector,

logic means for alternately outputting said signals during the time while light from said light source is passing through said opening of said opaque member simultaneously to said end of said first light-transmitting solid member and both of said first pair of photocells, and then during the time while light is passing through said opening of said opaque member simultaneously to said end of said second light-transmitting solid member and both of said second pair of photocells.

4,893,935

APPARATUS AND METHOD FOR OPTICAL DENSITY MEASUREMENTS OF BIOMASS PROCESSES

William R. Mandel, 122 B Avenida Dr., Berkeley, Calif. 94708, and Anthony J. Dekovich, 14930-C Reedley St., Moorpark, Calif. 93021

Filed Aug. 19, 1988, Ser. No. 234,367

Int. Cl.[4] G01N *21/00*

U.S. Cl. 356—436 **8 Claims**

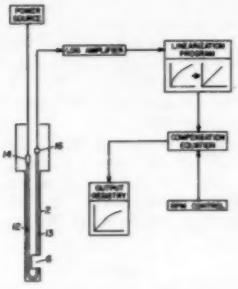
1. A method for monitoring a dynamic biological system in a biological reactor containing developing culture fluid media, by measuring the transmitted light in a defined cell, the steps which simultaneously comprise:

(a) irradiating fluid media in the cell;

(b) continually agitating the culture fluid media;

(c) detecting the transmitted light;

(d) converting the detected transmitted light to a non-linear electrical output signal;
(e) linearizing said non-linear electrical output signal;



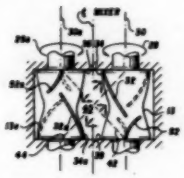
(f) compensating said linearized output signal for the effect of agitation; and
(g) recording the signal.

4,893,936

MIXING MACHINE WITH NON-INTERMESHING PAIR OF ROTORS DRIVEN SOLELY AT THE SAME ROTOR SPEED IN OPPOSITE DIRECTIONS AND HAVING A PREDETERMINED ROTATIONAL ALIGNMENT RELATIONSHIP BETWEEN THE TWO COUNTER-ROTATING ROTORS

Frank J. Borzenski, Branford, and Narku O. Nortey, Trumbull, both of Conn., assignors to Farrel Corporation, Ansonia, Conn.

Filed May 16, 1986, Ser. No. 864,096
Int. Cl.[4] B01F *7/12*; B29B *7/18, 7/24*
U.S. Cl. 366—76 **9 Claims**



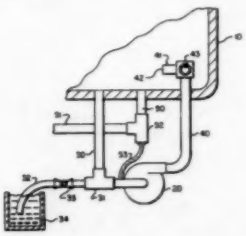
1. A mixing machine of the batch type for mixing batches of ingredients comprising housing means defining two horizontally opposed parti-cylindrical cavities with open sides facing one another and defining a chamber, said housing means having vertically spaced inlet and outlet openings communicating with said chamber and with said cavities, axially opposed end walls for said cavities and chamber, a ram for closing said inlet opening, a door for closing said outlet opening, two opposed non-intermeshing mixing rotors, respective ones of said rotors being provided in respective ones of said cavities, each said rotor having at least two generally spiral shaped wings, each wing having a leading end and a trailing end, drive means for rotating said rotors on parallel axes in said parti-cylindrical cavities, said drive means solely driving said rotors at the same speed and at opposite directions, said axes and end walls defining a rectangle in a horizontal reference plane extending across said cavities and chamber, said mixing rotors being non-intermeshing and turning in opposite directions at identical rotary speed to provide a window between the rotors and within said rectangle, said window having a cyclically variable geometry repeatable during each and every revolution of the rotors as a result of the rotor wings moving through said rectangle in the horizontal reference plane, each said rotor wing leading end being located adjacent one of said end walls and each rotor wing trailing end being located intermediate said end walls and being spaced circumaxially behind its leading end by an angle alpha relative to the direction of rotor rotation, said wings of opposed rotors being arranged in opposed pairs, a first pair of opposed rotor wings being on opposite sides of a first diagonal of said rectangle as said first pair of opposed rotor wings are moving through said rectangle at identical rotor speed, said first pair of opposed wings having leading ends that simultaneously move through said rectangle in the horizontal reference plane at approximately a same first time when said rotors turning at identical rotor speed have a predetermined constant rotational alignment relationship between them, said predetermined constant rotational alignment relationship being within ±20 degrees of zero degree alignment of the leading ends of said first rotor wings for transverse and axial squeeze mixing of the ingredients between said first pair of opposed rotor wings moving through said rectangle in the horizontal reference plane, said transverse and axial squeeze mixing between said first pair of rotor wings being toward said first diagonal from opposite sides of said first diagonal, and a second pair of opposed rotor wings being on opposite sides of a second diagonal of said rectangle as said second pair of opposed rotor wings are moving through said rectangle at identical rotor speed, said leading ends of said second pair of opposed rotor wings simultaneously moving through said rectangle in the horizontal reference plane at approximately a same second time, said second time being at a point in time after said first pair of opposed rotor wings have passed through said rectangle for transverse and axial squeeze mixing of the ingredients between said second pair of rotor wings moving through said rectangle in the horizontal reference plane, said transverse and axial squeeze mixing between said second pair of rotor wings being toward said second diagonal from opposite sides of said diagonal, said pairs of opposed wings cooperating to define successively formed window shapes and sizes that are repeated during each and every revolution of the opposed rotors, whereby ingredients in the chamber are mixed and urged from one parti-cylindrical cavity to the other parti-cylindrical cavity, and the mix is squeezed axially towards an intersection of said first and second diagonals of said rectangle at least twice during each and every revolution of the counter-rotating rotors turning at identical rotary speed.

4,893,937

APPARATUS AND METHOD FOR SUSPENDING SOLIDS

Ryszard Braun, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 30, 1988, Ser. No. 213,815
Int. Cl.[4] B01F *15/02*
U.S. Cl. 366—136 **6 Claims**



1. In mixing apparatus for use with a container of liquid, the apparatus comprising a centrifugal recirculating pump having inlet means for receiving liquid from a container and discharge means for delivering liquid to such container, the improvement wherein there is provided means for introducing a slurry of

highly concentrated solids to said inlet means from a source that is separate from the container.

4,893,938

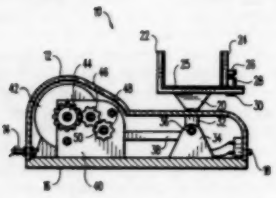
CONTAINER SHAKING DEVICE

Hilda K. Anderson, P.O. Box 5103, Goose Creek, S.C. 29445

Filed Mar. 8, 1989, Ser. No. 320,601

Int. Cl.[4] B01F *11/00*

U.S. Cl. 366—208 7 Claims



1. A container shaking device, comprising:

container holding means, said container holding means including an L-shaped member having a first leg portion and a second leg portion provided with an aperture for receiving a container neck;

a pivotal arm secured to said first leg portion of said container holding means;

an elongated reciprocal bar having a first end secured for pivoting said pivotal arm;

an elongated slot formed adjacent an opposite end of said reciprocal bar;

a rotary arm having a transverse pin received in said slot; and

means for rotating said rotary arm.

4,893,939

MIXING APPARATUS AND MIXING METHOD

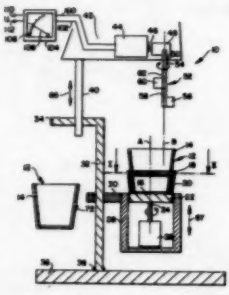
Klaus Burk, and Ulrich Burk, both of Overath, Fed. Rep. of Germany, assignors to Kunststoff-Spritzgusswerk Ing. Klaus Burk KG, Fed. Rep. of Germany

Filed Mar. 3, 1987, Ser. No. 21,203

Claims priority, application Fed. Rep. of Germany, Mar. 11, 1986, 3608038

Int. Cl.[4] B01F *9/12*

U.S. Cl. 366—224 10 Claims



1. Mixing means (10) comprising at least one mixing tool (52) and at least one mixing vessel (12) for mixing products, the mixing vessel (12) having a mixing chamber therein, where said mixing tool (52) is disposed, with respect to said mixing vessel (12), for providing a relative motion of said mixing tool (52) with respect to said mixing vessel (12), such that said mixing tool (52) is, at least partially, in contact with the mixing chamber of said mixing vessel (12) during the mixing process, the mixing tool (52) being provided with a shaft (122, 124) and stirring wings (134, 136, 138, 140), protruding from said shaft (122, 124) and comprising an inner section (134*a*, 136*a*, 138*a*, 140*a*) adjacent to said shaft (122, 124) and an annexed outer section (134*b*, 136*b*, 138*b*, 140*b*), said outer section (134*b*, 136*b*, 138*b*, 140*b*) being substantially more flexible than said inner section (134*a*, 136*a*, 138*a*, 140*a*),

wherein a rotating means (22, 24, 26) is provided for rotating said mixing vessel (12),

wherein said rotating means (22, 24, 26) comprises receiving means (18, 20) for said mixing vessel (12),

wherein said receiving means (18) and said mixing vessel may be detachably secured to each other by means of locking means (64, 66, 68, 70, 72, 74).

4,893,940

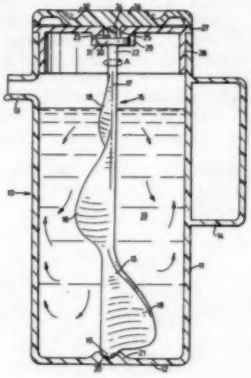
STIRRER DEVICE FOR A BEVERAGE PITCHER, AND BEVERAGE PITCHER INCORPORATING SUCH A STIRRER DEVICE

Stephen L. Waisberg, 6 Farningham Crescent, Islington, Ontario, Canada M9B 3B5

Filed Mar. 9, 1987, Ser. No. 23,681

Int. Cl.[4] B01F *7/18*

U.S. Cl. 366—247 16 Claims



1. A stirrer device for a beverage pitcher, the stirrer device comprising elongated vane means which has a first end and an opposed second end and which comprises a plurality of axially spaced vane lobes substantially equiangularly spaced about a longitudinal axis, the maximum radial extent of the vane lobes from the longitudinal axis decreasing in the direction from said first end towards said second end of the vane means, and each vane lobe being of generally spiral form about the longitudinal axis with the edge thereof merging smoothly from the maximum radial extent of said vane lobe towards said longitudinal axis.

4,893,941

APPARATUS FOR MIXING VISCOUS LIQUID IN A CONTAINER

Joseph M. Wayte, 14301 Greenbelt Drive E, Sumner, Wash. 98392

Continuation-in-part of Ser. No. 69,813, Jul. 6, 1987, abandoned. This application Jun. 29, 1988, Ser. No. 213,078

Int. Cl.[4] B01F *5/12*

U.S. Cl. 366—265 14 Claims

1. A mixing device for mixing a body of liquid and dispersed

solids confined in an open top consisting comprising in combination;

a rotatable mixing shaft, said shaft being substantially vertical and having a top and a bottom end for insertion into said container,

a planar imperforated circular disc having top and bottom surfaces with the top surface thereof fixedly connected to the bottom end of said shaft at the center point of the disc for rotation therewith,

said disc being normal to said shaft and having a substantially smooth circular unobstructed flat bottom surface,

a plurality of vane means fixed to the top surface of said disc and spaced equidistantly about the circumference thereof for driving liquid in a lateral direction away from said mixing shaft upon rotation of the shaft in one direction,

said vane means being located within the peripheral confines of said disc, and

baffle means overlying each said vane means for preventing upward vertical flow in the area of said vanes so as to concentrate the flow of liquid laterally along said vanes,

said baffle means being spaced radially outwardly from said shaft to provide a controlled flow passage for downward vertical flow of liquid as it is drawn downwardly by the lateral flow produced by said vanes,

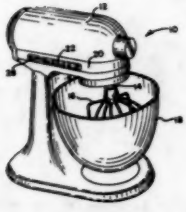
whereby liquid is caused to flow vertically downwardly along said shaft and then moved laterally along said vanes with great force upon rotation of said shaft in said one direction, said flat smooth bottom and the circular configuration of the disc permitting operation of the mixing device on the bottom surface and inside peripheral edge of the container without damage to the container walls.

4,893,942

MEMBRANE POTENTIOMETER SPEED SELECTION CONTROL FOR AN ELECTRIC FOOD MIXER

Richard L. Stottmann, Louisville, Ky., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed Dec. 23, 1987, Ser. No. 137,459
Int. Cl.[4] B01F *7/18*; H02P *5/06, 7/18*
U.S. Cl. 366—279 **19 Claims**



1. An electric food mixer comprising:

at least one beater;

a motor for rotating said beater;

elongated membrane speed selection means having a plurality of contiguous locations along the length of said means representing a plurality of selectable running speeds of said motor and responsive to a user's touch at one of said locations for providing a signal representing a selected motor speed; and

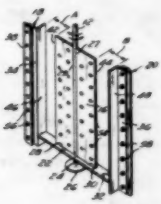
means responsive to said selected motor speed signal for controlling the speed of said motor.

4,893,943

METHOD AND APPARATUS FOR LOW FROTH AGITATION OF TANKED FLUIDS

John L. McKelvey, Lakeland, Fla., assignor to The Ink Company, West Sacramento, Calif.

Filed Jun. 27, 1988, Ser. No. 212,268
Int. Cl.[4] B01F *7/16*
U.S. Cl. 366—312 **14 Claims**



1. A fluid mixing and tank wall wiping device positionable within a holding tank having an inner wall surface, said device comprising:

a vertical shaft member positionable at a first location within said holding tank and operative to undergo at least partial rotational movement therewithin;

at least one perforated panel having an upper edge, a lower edge, an inner edge, an outer edge, and a plurality of apertures extending therethrough, said panel being positioned such that the inner edge thereof is in alignment with at least a portion of said vertical shaft, said panel being thereby disposed in a vertical plane which extends laterally from said vertical shaft;

at least one elongate tank wall wiper blade, each said elongate wiper blade being positioned laterally outboard of, and held a fixed distance from the outer edge of a selected perforated panel, thereby defining a void between each selected perforated panel and its corresponding tank wall wiper blade positioned laterally outboard thereof; and

means for operatively connecting (a) said vertical shaft, (b) said at least one perforated panel, and (c) said at least one wiper blade, such that rotational movement of the vertical shaft member will result in corresponding rotational movement of said at least one panel and said at least one wiper blade;

said mixing assembly being sized and configured so that, when said vertical shaft is positioned at said first location within said holding tank, said at least one wiper blade will be in contact with the inner wall surface and upon said rotational movement thereof, will travel along said inner wall surface to separate liquid therefrom.

4,893,944

NON-DESTRUCTIVE METHOD OF TESTING A WELD OBTAINED BY PRESSURE WELDING TWO METAL PARTS

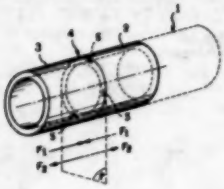
Jöel Leroux, Evreux, France, assignor to Serimer, Société a Responsabilité Limitée, Levallois Perret, France

Filed Dec. 29, 1988, Ser. No. 291,629
Claims priority, application France, Dec. 30, 1987, 87 18362
Int. Cl.[4] G01N *03/18*
U.S. Cl. 374—46 **6 Claims**

1. In a method of non-destructively testing a weld between

two metal parts butt-welded to each other at their junction surface by being heated to a predetermined welding temperature and subjected to a forging pressure applied to said parts so as to exert thereon a predetermined compression stress directed perpendicularly to said junction surface and of such a magnitude as to compact any defects in the weld to a substantially plane state; the improvement comprising the steps of:

applying a tensile stress to said weld perpendicularly to said



junction surface of said parts and on either side thereof directly after completion of the welding operation and while the weld is still hot between a maximum temperature close to the welding temperature and a predetermined minimum temperature, thereby to enlarge any defects in the weld present at said junction surface into a three-dimensional state; and

inspecting said weld with the aid of conventional fault detection means for detecting said three-dimensional defects.

4,893,945

TEMPERATURE SENSOR

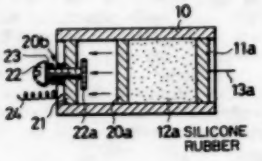
Teruo Okano, Houjo, and Tomomi Nagata, Tokyo, both of Japan, assignors to Nihex Co., Ltd., Tokyo, Japan

Filed Jul. 10, 1987, Ser. No. 72,206

Claims priority, application Japan, Dec. 2, 1986, 61-185044[U]; Dec. 27, 1986, 61-199832[U]; Jan. 8, 1987, 62-1090

Int. Cl.[4] G01K *5/48*; H01H *37/46*

U.S. Cl. 374—188 **3 Claims**



1. A temperature sensor comprising:

a heat sensing electrically insulating housing;

an electrically conductive silicone rubber means having thermal expansion and contraction characteristics which vary linearly with respect to changes in temperature conformably fitted within the housing;

an operating portion substantially positioned within one end of the housing for moving in response to the silicone rubber means, the operating portion including a fixed member and a movable member extending across the housing;

wherein the operating portion operates electrically in response to the thermal expansion and contraction of the silicone rubber means, the movable member being moved by the silicone rubber means for effecting, in conjunction with the fixed member, an electrical circuit.

4,893,946

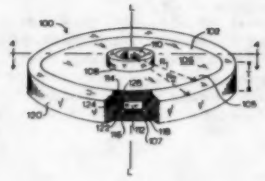
ROLLER FOR SPINNING FRAME

David W. Tesh, and David D. Wesner, both of Greensboro, N.C., assignors to Amkor Industries, Inc., Greensboro, N.C.

Filed May 15, 1989, Ser. No. 352,001

Int. Cl.[4] F16C *19/20*

U.S. Cl. 384—549 **21 Claims**



1. A spinning frame roller, comprising:

(a) a unitary, disc-shaped core body having a central axis and an outer peripheral surface with a radially reentrant dovetail channel therein, the core body having a central circular opening extending axially therethrough for mounting of the roller on a shaft for rotation therewith;

(b) a peripheral annular ring coextensive in axial thickness with a radially outer portion of the core body, the ring being characterized by:

(i) an inner facing surface having a dovetail protrusion radially inwardly extending therefrom, so that the inner facing surface and dovetail protrusion respectively matably engage the outer peripheral surface and dovetail channel of the core body;

(ii) a radial thickness W and an axial thickness T which are related to one another such that the aspect ratio W/T of the ring is from 0.25 to 0.65; and

(ii) being formed of an elastic, material having durometer value of from 55 to 90.

4,893,947

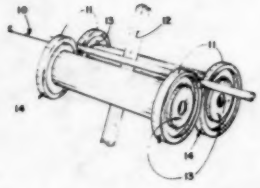
SPINNING MACHINE ROTOR SHAFT DISK

Robert E. Hurley, Route #3, Box 375-B, Sophia, N.C. 27350

Filed Jan. 23, 1989, Ser. No. 300,586

Int. Cl.[4] F16C *13/00*; D01H *7/882*

U.S. Cl. 384—549 **17 Claims**



1. A disk to support a spinning machine rotor shaft comprising: a hub formed from a rigid material, a tire, said tire formed from an elastomeric material, said hub having a substantially circular periphery, said periphery defining an indention, said indention having a width below the outer circular surface of said periphery greater than the width of said indention at said outer circular surface, said indention for receiving said tire for affixing said tire to said hub.

4,893,948

DEVICE FOR BEARING MOUNTING MECHANISM

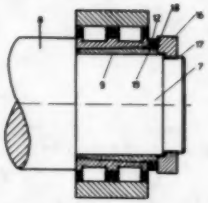
Paul-Gerhard Hoch, Schweinfurt, Fed. Rep. of Germany, assignor to SKF GmbH, Schweinfurt, Fed. Rep. of Germany

Filed Aug. 12, 1988, Ser. No. 231,882

Claims priority, application Fed. Rep. of Germany, Aug. 14, 1987, 3727150

Int. Cl.[4] F16C *19/28*

U.S. Cl. 384—551 5 Claims



1. Device for mounting a bearing including an inner ring with a conical bore on a bearing seat, said device comprising a conical clamping sleeve having a larger diameter end projecting an axial distance (A) beyond the inner ring, and means for mounting the bearing to provide a different degree of pretension by a single clamping sleeve using spacers of different thicknesses, said spacer (12) loosely and non-threadedly mounted on the outer conical surface of the clamping sleeve, the thickness of said spacer being less than that of the axial projection (A) in the preassembled state by an amount equal to the stroke (B) required to press in the clamping sleeve (9), the spacer thus limiting the distance (B) of the inward stroke to achieve a predetermined radial tension and a nut member (16) for axially displacing the spacer and sleeve relative to one another said distance (B).

4,893,949

DISTANCE ADJUSTER FOR A PRINT HEAD OF AN OFFICE MACHINE

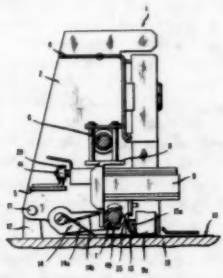
Alois Limberger, Grüningen; Berhard Nolte, Villingen, and Dieter Stellmach, Bad Dürrheim, all of Fed. Rep. of Germany, assignors to Mannesmann Aktiengesellschaft, Düsseldorf, Fed. Rep. of Germany

Filed Feb. 29, 1988, Ser. No. 161,916

Claims priority, application Fed. Rep. of Germany, Feb. 28, 1987, 3706573

Int. Cl.[4] B41J *11/20*

U.S. Cl. 400—56 20 Claims



1. A device for adapting a distance of a print head relative to a thick print material in an office machine comprising

a frame;

a print surface support attached to the frame;

guide rails attached to the frame running substantially parallel to the print surface support;

a print head carriage supported by the guide rails so that the print head carriage can be moved back and forth in parallel to the print surface support between end positions; a print head disposed on the print-head carriage to be carried by the print head carriage in parallel to a print surface support between defined end sections, where the print head can be set perpendicular with respect to the print surface support against a spring force relative to the print surface support;

a bendable strip running parallel to the print-surface support, where the bendable strip rests during the printing process solidly on the thick print material, wherein the bendable strip is disposed in a rest position at a distance running parallel and corresponding to the thickest print material to be printed above the print support, where at least one strip end is longitudinally attached to the frame under a tension spring force in the longitudinal directions, where cutout sections in the bendable strip are disposed near the defined end position sections and wherein the bendable strip exhibits at least for the length of the cutout sections a laterally staggered strip width section;

a rotatable roller supported on the print-head carriage, which roller has a running surface and which roller rests on the bendable strip, where the print-head carriage can be lifted by the print material in a limited amount at the end positions of the print head carriage over the defined end position sections, and where the cutout sections do not allow a transfer of a support force onto the bendable strip with the running surface of the rotatable roller.

4,893,950

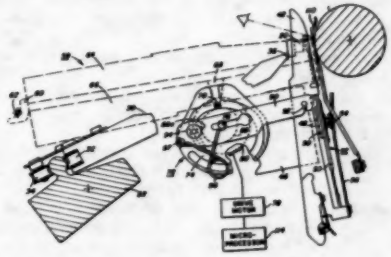
APPARATUS AND METHOD FOR CONTROLLING THE POSITIONING OF MARKING ELEMENTS IN A SERIAL IMPACT PRINTER

Robert A. Ragen, Hayward; Andrew Gabor, Alamo; Ivor Weller, Castro Valley; Michiel Frankhuizen, Martinez, and Brian E. Jagger, Pleasanton, all of Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed Sep. 28, 1988, Ser. No. 250,798

Int. Cl.[4] B41J *1/30*

U.S. Cl. 400—185 9 Claims



1. A serial impact printer including a platen mounted for rotation about its axis, a scanning carriage mounted for movement along a path parallel to said axis and supporting thereon character imprinting means, a ribbon assembly including a marking ribbon and a correcting ribbon disposed one above the other, and hammer means for impacting said character imprinting means, said printer being characterized by marking element position control means comprising

a unitary cam for raising and lowering said ribbon assembly and for moving said character imprinting means toward

and away from said platen to vary a throat gap distance therebetween,

drive means for rotating said cam means,

sensor means for generating a signal when said throat gap distance deviates from a predetermined reference distance, and

computing means for receiving said signal and for controlling the energization of said drive means in response thereto.

4,893,951

INK RIBBON POSITIONING SYSTEM FOR COLOR PRINTING APPARATUS

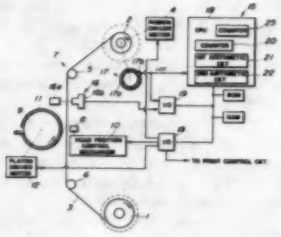
Mitsuo Iwatani, Kanagawa; Hiroaki Takano, Tokyo, and Masatoshi Mikuriya, Kanagawa, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Mar. 17, 1988, Ser. No. 169,510

Claims priority, application Japan, Mar. 20, 1987, 62-65969

Int. Cl.[4] B41J *33/34*

U.S. Cl. 400—225 **8 Claims**



1. An ink ribbon positioning system for a color printing apparatus, comprising:

a paper platen on which a printing paper is arranged;

a platen driver motor coupled to said platen;

an ink ribbon having a plurality of color sets, each color set having a plurality of color ink regions and a color set marker provided at a beginning of each of said color sets on the ink ribbon;

a take-up reel and a supply reel for transporting said ink ribbon therebetween, said ink ribbon being wound on each of said reels with winding diameters that change during said transporting;

a printer head movable between a head-down position and a head-up position;

head control means coupled to said printer head for moving said printer head between said head-down position and said head-up position, said printing paper and said ink ribbon being pressed against said paper platen by said printer head at said head-down position of said printer head for performing a printing operation;

a sensor for detecting said color set marker of said ink ribbon, whereby a positioning of said first color ink region of said each color set to a print start position is performed in response to detection of said color set marker;

a pulse generator coupled to one of said take-up and supply reels;

a counter circuit connected to said pulse generator for counting the number of pulses N_1 during said printing operation of said first color ink region over a constant length l_1, at said head-down position of said printer head, whereby said counter circuit produces a variable output based on N_1 and l_1;

a calculation circuit responsive to the variable output of said counter circuit for calculating a number of pulses N_2 to be generated by said pulse generator for positioning a second color ink region of the each color set to said print start position and producing an output signal based on the calculation; and

an ink ribbon drive circuit for causing said take-up reel and supply reel to transport said ink ribbon to position a second color ink region of said each color set in response to the output signal from said calculation circuit, said second color ink region being displaced from said first color ink region by a constant distance l_2;

wherein N_1 and N_2 are updated during said transporting in view of changes in said winding diameters.

4,893,952

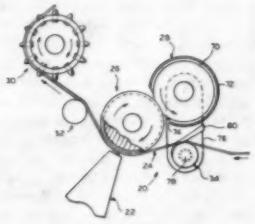
DOT MATRIX PRINTING SYSTEM INCLUDING IMPROVED INK TRANSFER MECHANISM

Eduard Svyatsky, Chicago, Ill., assignor to Bell & Howell Company, Chicago, Ill.

Filed Oct. 16, 1987, Ser. No. 109,474

Int. Cl.[4] B41J *3/12, 27/02*

U.S. Cl. 400—470 **8 Claims**

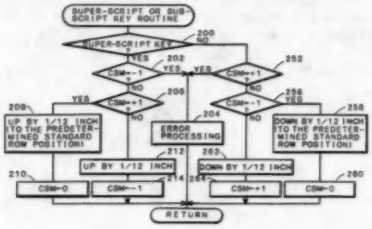


1. A printing system including a cavitated ink transfer means carrying a predetermined amount of ink in its cavities for use in an electronically controlled printer that includes a dot matrix printing head having impression pin means, at least one workpiece carried by a support medium in spaced relation to said cavitated ink transfer means, said at least one workpiece adapted to be pushed sequentially by said pin means from its backside through said support medium to cause its front surface to pick up predetermined amounts of said ink from said cavitated ink transfer means in predetermined symbol array, said ink transfer means being a roller wherein said cavities are indiscriminately placed in close tight relation providing cavities for retention of ink material by surface tension as series of ink droplets positioned in close proximity, whereby movement of said impression pins of said matrix printing head moves selected areas of said at least one workpiece into contact with certain of said droplets to form indicia means on the surface of said workpiece, said ink transfer roller further including an assembly having a central generally cylindrical portion, said plurality of cavities being impressed in the surface of said central portion, at least one guide roller positioned adjacent at least one end of said cylindrical portion, said guide roller having a diameter slightly larger than said central portion, the difference in the radial extent between said roller and said central portion being at least as great as the thickness of said at least one workpiece, said support medium riding on said guide roller and supporting a plurality of said at least one workpiece individually and sequentially in position over said central portion, said impression pins locally depressing said support medium and one of said at least one workpiece into contact with the ink carried by said central portion, and thereby sequentially creating a predetermined symbolic array on each of said at least one workpiece.

4,893,953
PRINTER FOR NORMAL LINE FEED BY A CARRIAGE RETURN

Yuji Kawakami, and Sae Kawakami, both of Nagoya, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Apr. 7, 1988, Ser. No. 178,536
Claims priority, application Japan, Apr. 14, 1987, 62-91320
Int. Cl.[4] B47J *11/44;* B41J *19/76*
U.S. Cl. 400—582 9 Claims



1. A printer comprising:

line feed control means for moving a print position vertically;

memory means for storing data of vertical movement of the print position from one of a plurality of predetermined standard row positions when the print position is moved vertically by the line feed control means from one of said predetermined standard row positions, distance between the predetermined standard row positions corresponding to a preset line feed amount;

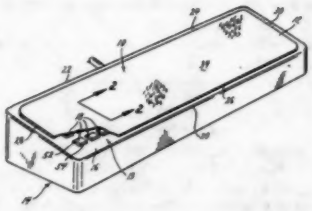
carriage return control means responsive to a carriage return code for moving the print position down by the preset line feed amount by utilizing the line feed control means, and for moving the print position to a preset left margin position; and

compensating means for adjusting the preset line feed amount to be moved by the carriage return control means based on the vertical movement data stored in the memory means.

4,893,954
REMOVABLE KEYBOARD COVER FOR OFFICE MACHINES

Donald R. Kotur, 839 Castlebar Ct., Ballwin, 63021

Filed May 13, 1987, Ser. No. 49,095
Int. Cl.[4] B41J *11/62*
U.S. Cl. 400—714 6 Claims



1. A removable protective cover for the keys of a keyboard for computers, typewriters, word processors, and calculators with the keys having top portions, the said cover comprising:

(a) a thin sheet of flexible material for placing over the keyboard keys;

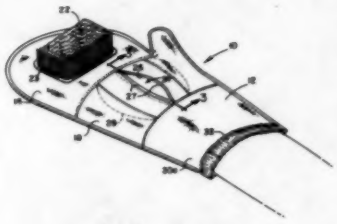
(b) the sheet having an upper surface and a lower surface, and

(c) the lower sheet surface having a plurality of shallow recesses shaped for receiving and engaging the top portions of the keys, the recesses being at least substantially contained within the thickness of the sheet and having surfaces so that contact between the keys and the surfaces of the recesses resists sliding movement of the sheet away from the keys, and wherein the cover must be removed from the keyboard so that an operator can press the keys to operate the computer, typewriter, word processor or calculator, the upper surface of the cover being substantially flat and of sufficient friction so that the cover may be placed on the surface of a desk and used for a mouse pad.

4,893,955
THERAPEUTIC SCRUBBING MITTEN

Karmella Zielinski, 3 Northumberland Dr., Mount Holly, N.J. 08060

Filed Feb. 5, 1988, Ser. No. 152,833
Int. Cl.[4] A46B *11/00;* A47L *13/19*
U.S. Cl. 401—7 13 Claims



1. A mitten for therapeutic cleansing of the scalp comprising:

a body of flexible sheet material formed to fit over a hand, said body having a front panel and a back panel, said front panel having a finger portion, a palmar portion and a panel opening formed in the palmar portion, said panel opening having a major dimension coextensive with the palmar portion of said front panel;

a plurality of soft bristles secured to the finger portion of said front panel;

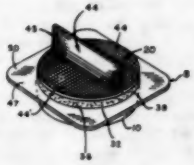
reservoir means underlying said palmar portion for holding a quantity of liquid, said reservoir means communicating with the panel opening; and

means for retaining said body on the hand.

4,893,956
PACKAGING FOR MEDICAMENTS

Michael A. Wojcik, and Steven L. Kliff, both of Oak Brook, Ill., assignors to Blistex Inc., Oak Brook, Ill.

Filed Nov. 18, 1988, Ser. No. 272,916
Int. Cl.[4] A45D *33/00;* A61M *35/00*
U.S. Cl. 401—130 13 Claims



13. An ointment-conserving applicator comprising a first disk-like member having an ointment, receiving side of nonpermeable material, and

a second disk-like member of nonpermeable material on the opposite side of the applicator including a foldable handle,

a compressible sponge-like plastic pad sandwiched between said first and second disk-like members and permanently affixed thereto, said side of said first member on said nonpermeable material preventing the ointment from seeping into said pad.

4,893,957

DISPENSER BRUSH

Ole Byriel, Jyllinge, Denmark, assignor to Eveline A/S, Jyllinge, Denmark

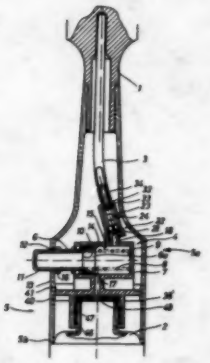
PCT No. PCT/DK88/00051, § 371 Date Nov. 18, 1988, § 102(e) Date Nov. 18, 1988, PCT Pub. No. WO88/07339, PCT Pub. Date Oct. 6, 1988

PCT Filed Mar. 25, 1988, Ser. No. 275,058

Claims priority, application Denmark, Mar. 26, 1987, 1559/87

Int. Cl.[4] A46B *11/02*

U.S. Cl. 401—146 9 Claims



1. A dispenser brush assembly which comprises

an elongated brush element which defines a longitudinal axis and which includes a head having discharge openings for a liquid, a tubular handle connected to said head, and a tube means for conveying liquid to said discharge openings, said tubular handle having a side wall with an opening for an actuator button and an entry end opposite said head,

an insert assembly which includes a cylinder having a side wall and a bottom wall, a piston which is movable within said cylinder between a first position and a second position, said second position being closer to said bottom wall than said first position, an actuator button connected to said piston, a spring means biasing said piston into said first position, a first hollow stub connected to said cylinder and communicating with an outlet opening in said side wall thereof near said second position, a second hollow stub connected to said cylinder and communicating with an inlet opening in said side wall thereof near said first position, a flange connected to said second stub, said flange including an opening in communication with the interior of said second hollow stub and a tubular protrusion in which the neck of container means for liquid can be positioned, and a venting element located within said tubular protrusion and positionable between said flange and the neck of a container means positioned within said tubular protrusion, said flange being dimensioned so that said insert assembly can be inserted into the entry end of said tubular handle such that said cylinder will be perpendicularly oriented relative to said longitudinal axis and said actuator button will extend through said opening in said side wall of said tubular handle, and

a closing member for preventing liquid flow into said cylinder through said first stub, movement of said piston by said actuator button from said first position of said second position within said cylinder causing a controlled amount of liquid to flow to and through said discharge openings.

4,893,958

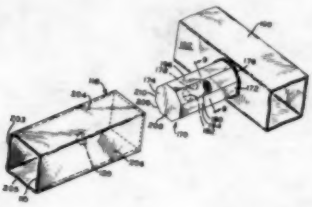
JOINT FOR DEMOUNTABLE FURNITURE

Roy M. Wieland, Fort Wayne, Ind., assignor to R. M. Wieland Company, Grabill, Ind.

Continuation-in-part of Ser. No. 95,767, Sep. 11, 1987, which is a continuation-in-part of Ser. No. 499,812, Jun. 1, 1983, abandoned. This application Oct. 5, 1988, Ser. No. 253,665

Int. Cl.[4] B25G *3/00*

U.S. Cl. 403—7 9 Claims



1. A joint for attaching a first component of an article of furniture to a second component thereof, comprising:

an elongated polygonal tubular member having at least one edge portion, said tubular member mounted at one end to said first component, said tubular member having an end opening, a plurality of generally planar sidewalls and an access opening in said edge portion;

an elongated polygonal bar member mounted at one end to said second component and being adapted to axially slip fit into said tubular member through said end opening, said bar member including a transverse threaded bore having an end opening, said bar member having at least two generally planar sides located adjacent said bore end opening, said access opening being located to align with said threaded bore when said bar member is slip-fitted into said tubular member;

and means for locking said bar member within said tubular member when said bar member and said tubular member are operatively assembled with two of said bar member planar sides respectively aligned with and bearing against two of said planar side walls, and said end opening spaced away from said edge portion, said locking means comprising set screw means threadedly engaged with said transverse threaded bore for directly contacting and simultaneously bearing against two of said side walls of said tubular member.

4,893,959

CONNECTOR

Adrian G. Offenbroich, Düsseldorf, Fed. Rep. of Germany, assignor to Foga EHT-System AB, Malmo, Sweden

Filed Jun. 7, 1988, Ser. No. 203,104

Claims priority, application Sweden, Jun. 10, 1987, 8702398-2

Int. Cl.[4] F16B *7/08*

U.S. Cl. 403—12 7 Claims

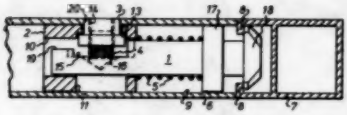
1. A connector for releasably connecting a first building element to a second building element, the first building element including an engageable edge and the second including a connection end having a cavity, said connector comprising:

a first sleeve having the same cross-sectional shape as the cavity so as to be insertable therein, said first sleeve having a longitudinal hole,

an elongate clamping member provided to be receivable within said longitudinal hole, said clamping member comprising, at an outer end portion thereof, a hook formed for engagement with the engageable edge and, on a portion thereof received in said first hole, a bevelled surface,

a second sleeve having a threaded hole, and

a clamping screw which, when turned in said threaded hole in said second sleeve, is movable transversely of said



clamping member to a position with the tip of said screw against said bevelled surface under spring bias between said first sleeve and said clamping member, said bevelled surface being provided in a transverse recess in said clamping member, said second sleeve being depressable into said transverse recess against the spring bias to a position in which said second sleeve is located completely inside of said first sleeve.

4,893,960

WHEEL BEARING/CONSTANT VELOCITY JOINT UNIT

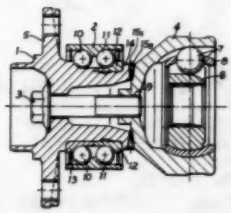
Rudolf Beier, Offenbach am Main, and Hans-Heinrich Weischof, Rodenbach, both of Fed. Rep. of Germany, assignors to Lohr & Bromkamp GmbH, Offenbach am Main, Fed. Rep. of Germany

Filed Oct. 26, 1987, Ser. No. 113,008

Claims priority, application Fed. Rep. of Germany, Oct. 24, 1986, 3636243

Int. Cl.[4] F16B *1/00*

U.S. Cl. 403—24 **7 Claims**



1. A wheel bearing/constant velocity joint unit with a constant velocity joint, a double row bearing (2) provided with at least one inner bearing ring (12) separate from a wheel hub (1) and said inner bearing ring is axially held or tensioned by a formed collar (14) on the wheel hub (1), wherein the improvement comprises that said collar extends radially outward at least partially coextensive with and in contact with said inner bearing ring, spur or helical teeth (15) are formed into the formed collar (14) of the wheel hub (1) in the region at least partially coextensive with the inner bearing ring (12), and said spur or helical teeth are directly and non-rotatingly connectable to one joint component (4) of said constant velocity joint.

4,893,961

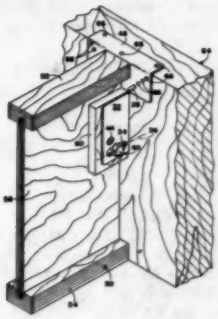
JOIST HANGER

Kevin B. O'Sullivan, and Arthur L. Troutner, both of Boise, Id., assignors to Trus Joist Corporation, Boise, Id.

Filed Jun. 5, 1989, Ser. No. 361,591

Int. Cl.[4] F16L *3/00*; E04C *7/00*

U.S. Cl. 403—232.1 **20 Claims**



1. A glued-block hanger system for supporting an I-beam joist on a support, comprising:

a block which is secured to the web of an I-beam joist at the ends thereof intermediate the top and bottom chords, said block and the web having a bore extending therethrough at a predetermined position;

a hanger including a top tab and an end plate, said top tab being constructed and arranged to extend over the top of a support with said end plate extending down a side of the support, and a pair of opposed, spaced apart flanges extending outward from said end plate, said flanges being spaced apart to snugly receive the joist web and block therein, each of said flanges further including an opening formed therein, said opening being aligned with said bore when the top chord of the joist is aligned with said top tab; and

a connector which extends through said bore and said opening, thereby fastening the joist on the hanger.

4,893,962

COUPLING

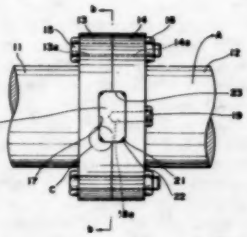
Nobuo Komeyama, Osaka, Japan, assignor to Koyo Seiko Co., Ltd., Osaka, Japan

Filed Jan. 26, 1989, Ser. No. 301,942

Claims priority, application Japan, Jan. 27, 1988, 63-9082[U]

Int. Cl.[4] B25G *3/00*

U.S. Cl. 403—288 **5 Claims**



1. A coupling, comprising:

a pair of connecting members adapted to be fixed to associated ends of two shafts to be coupled together;

a keyway in each of said connecting members in the side of each said connecting member substantially facing the other said connecting member, each of said keyways having at least one side wall;

key means disposed between said connecting members and received in said keyways, said key means having side faces abutting associated ones of said side walls of said keyways for transferring torque, said key means and said keyways having spaced substantially facing portions which do not transfer torque and which define gaps within said keyways; and

watertight seal means within said gaps.

4,893,963

SYSTEM FOR COUPLING TWO BODIES, FOR EXAMPLE A CARRIAGE AND A MACHINING STATION

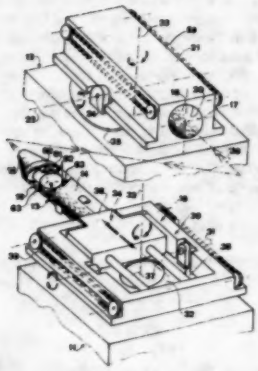
Jean-Francois Le Goff, Vitry-sur-Seine, France, assignor to Aerospatiale Societe Nationale Industrielle, Paris, France

Filed Sep. 2, 1988, Ser. No. 239,625

Claims priority, application France, Sep. 11, 1987, 8712617[U]

Int. Cl.[4] F16B *21/00*

U.S. Cl. 403—322 **7 Claims**



3. A system for coupling two bodies able to move relatively with respect to each other, comprising:

a frame mounted on one body of said two bodies and able to rotate about a first axis with respect to said one body, a head mounted on said frame and able to rotate about a second axis with respect to said body, said head having a cavity and being biased by first and second spring biasing means to a reference position, said first spring biasing means being disposed between said one body and said frame and said second spring biasing means being disposed between said frame and said head;

a plate mounted on the second of said two bodies and able to rotate about a first axis with respect to said second body, a base mounted on said plate and able to rotate about a second axis with respect to said body, said base having an extendable projecting part able to penetrate into said cavity and being biased by first and second spring biasing means being disposed between said second body and said plate, and said second spring biasing means being disposed between said plate and said base;

said extendable projecting part having transverse expandable means able to contact the inner wall of said cavity.

4,893,964

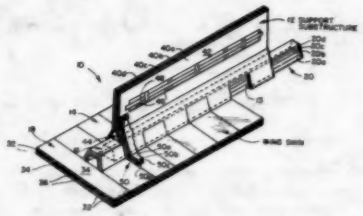
INTERLOCKING STRUCTURAL MEMBERS UTILIZING OVERLYING COMPOSITE STRIPS

Robert E. Anderson, Huntington Station, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Feb. 6, 1989, Ser. No. 306,179

Int. Cl.[4] F16B *1/00*

U.S. Cl. 403—376 **13 Claims**



7. An integrally formed joint for interlocking first and second structural members comprising:

a) a first structural laminate member having a plurality of alternating bonded sequences of first, second and third plies, the member more particularly including

i) first plies each having a plurality of spaced parallel strips wherein each strip is raised at an intermediate point to form a projection;

ii) second plies each having a plurality of parallel spaced strips located perpendicular to the strips of the first ply;

iii) third plies each having a plurality of parallel spaced strips, each strip being respectively parallel and adjacent to a strip of the first ply;

b) a second structural laminate member having a plurality of bonded plies and including an elongated base portion having an open cross section and spaced recesses therealong which receive corresponding overlying projections of the first member thereby forming interdigital engagement therebetween; and

c) an elongated laminate bar formed from a plurality of bonded plies and received within the interdigitating projections and base portion for securing engagement of the first and second structural members.

4,893,965

SYSTEM FOR OFFSHORE OPERATIONS

Peter A. Jordan, 'Rosslyn' Lower Road, Cookham Rise, Maidenhead, Berkshire, Great Britain

PCT No. PCT/GB87/00174, § 371 Date Mar. 3, 1988, § 102(e) Date Mar. 3, 1988, PCT Pub. No. WO87/05577, PCT Pub. Date Sep. 24, 1987

PCT Filed Mar. 13, 1987, Ser. No. 124,103

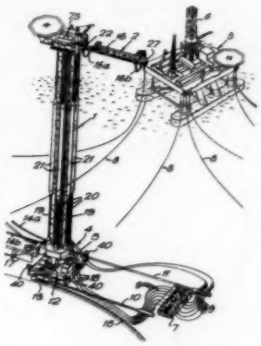
Claims priority, application United Kingdom, Mar. 13, 1986, 8606225

Int. Cl.[4] E02B *17/02*

U.S. Cl. 405—202 **18 Claims**

1. A system for offshore operations comprising a base for attachment to the seabed, a column for articulation to the base to extend upwardly therefrom, the articulation including first and second universal joints, the first universal joint including a plurality of relatively rotatable joint surfaces disposed radially outwardly of the longitudinal axis of the column whereby to provide an axial opening through the first joint, the second universal joint being disposed in said axial opening, the first and second joints being so arranged that normally the first joint is loaded by the column and said second joint is substantially unloaded, but in the event of failure of the first joint said sec-

ond joint is arranged to assume the entire column load without failure thereof, and a plurality of risers extending longitudinally of the column through said space in the first universal joint for coupling to the seabed.



4,893,966

LOCK APPARATUS FOR INTRODUCING DRY GRANULAR MATERIALS INTO A PNEUMATIC CONVEYING CONDUIT AND SPRAY GUN FOR SUCH MATERIALS

Franz Roehl, Peter-Boehler-Strasse 3, D-6000 Frankfurt am Main, Fed. Rep. of Germany

Filed Jun. 29, 1988, Ser. No. 212,883

Claims priority, application Fed. Rep. of Germany, Jul. 7, 1987, 3722314; European Pat. Off., Jan. 16, 1988, EP88100582.1; Fed. Rep. of Germany, Jun. 9, 1988, 8807520[U]

Int. Cl.[4] B65G *53/46, 53/40, 53/52, 53/54*

U.S. Cl. 406—127 **4 Claims**

4. Spraying apparatus for substantially dry concrete mixtures or similar building materials, characterized in that it comprises a plurality of lock apparatuses, each lock apparatus being adapted to deliver such materials from a material supply means into a pneumatic spray conveying conduit, each lock apparatus comprising a lock chamber, a tubular connecting piece communicating with the pneumatic spray conveying conduit, first conduit means interposed between and in communicating relationship with the material supply means and the lock chamber, and second conduit means interposed between and in communicating relationship with the lock chamber and the tubular connecting piece, the said materials passing from the material supply means through the first conduit means, the lock chamber, the second conduit means, the tubular connecting piece into the pneumatic spray conveying conduit, each lock apparatus being characterized by:

(a) the lock chamber (44) is positioned below the material supply means (2) and above the tubular connecting piece (30),

(b) an upper hose (16) defines said first conduit means,

(c) a lower hose (22) defines said second conduit means,

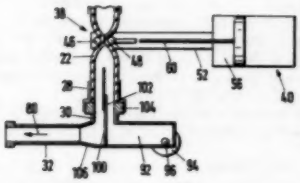
(d) inlet shut-off means (34) are provided between said lock chamber (44) and said material supply means (2), said inlet shut-off means (34) being adapted to engage the exterior of upper hose (16) to close or selectively to open said upper hose (16),

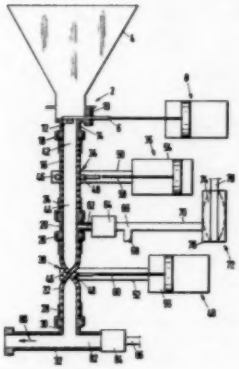
(e) first operating means (36) operatively connected to said inlet shut-off means (34) are provided and are adapted to actuate said inlet shut-off means (34) to close or selectively to open said upper hose (16),

(f) outlet shut-off means (38) are provided between said lock chamber (44) and said tubular connecting piece (30), said outlet shut-off means (38) being adapted to engage the exterior of lower hose (22) to close or selectively to open said lower hose (22).

(g) said tubular connecting piece (30) communicates with said spray conveying conduit (32) at a position between ends of said spray conveying conduit (32),

(h) a partition (100) is provided transversely within said spray conveying conduit (32) to define therein a first passageway for said materials leading to one end of said spray conveying conduit (32) and a second passageway leading





to a chamber (92) adjacent the opposite end of said spray conveying conduit (32),

(i) a blowing air connection (96) is provided in communication with said chamber (92),

said spraying apparatus being characterized in that:

(j) said plurality of lock apparatuses are actuable in phase-displaced timing,

(k) an air overflow conduit (90) connects those portions of upper hose (16) above the inlet shut-off means (34) of all of said plurality of lock apparatuses.

4,893,967

CUTTING TOOL ARRANGEMENT

Leonard A. Briese, 5039 Browndeer La., Rancho Palos Verdes, Calif. 90274

Division of Ser. No. 102,038, Sep. 29, 1987, Pat. No. 4,828,436. This application Feb. 22, 1989, Ser. No. 313,757

Int. Cl.[4] B23B *27/12*

U.S. Cl. 407—7 **36 Claims**

1. An improved rotating cutting tool cartridge arrangement comprising, in combination:

an annular bushing means having a predetermined axis, a first end surface and second end surface and said second end surface axially spaced a predetermined distance from said first end surface, an outside surface, a threaded inside surface, a pair of spaced apart walls defining a slot extending axially from said first end surface to said second end surface and radially from said outside surface to said inside

surface, and said pair of spaced apart walls having limited resilient movement towards and away from each other;

bearing means coaxially mountable in said bushing means and having an outer end and an inner end, first walls defining an external surface extending from said outer end to said inner end, said external surface having:

a first threaded portion extending from said inner end towards said outer end for threading engagement with said threaded inside surface of said split bushing means;

a second shoulder portion adjacent said outer end; and,

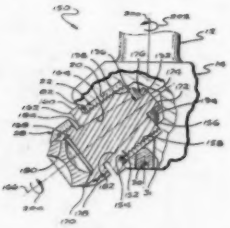
a tapered bearing surface extending from said outer end inwardly towards said axis to said inner end;

spindle means coaxially mountable in said bearing means and having an insert end and an interior end, said interior end having a thrust bearing means mounting portion, said insert end having an internal cutting insert matching surface, and an exterior surface having:

a first threaded portion at said insert end;

a second boss portion adjacent said first threaded portion; and

an external bearing surface for engaging said internal bearing surface of said bearing means for relative rotary motion therebetween, and extending from said second boss portion to said thrust bearing means mounting portion;



thrust bearing means mountable on said thrust bearing portion of said spindle means for rotation therewith and having a thrust bearing surface means for rotary engagement with said inner end of said bearing means;

cutting insert means mountable in said insert end of said spindle means and having a medial plane, a cutting edge end and a mounting end spaced axially a predetermined distance from said cutting edge end, an external flank surface tapering inwardly from said medial plane to said cutting edge end, an external mounting surface tapering inwardly from said medial plane to said mounting end, said mounting surface of said cutting insert means positionable contiguous said matching surface of said spindle means; and

a clamping nut means having a spindle means end and a clamping end, first walls extending from said spindle means end defining an internal threaded surface for threading engagement with said first threaded portion of said spindle means, second walls extending from said insert end defining an internal clamping surface for clamping engagement with said flank surface of said cutting insert;

whereby said cutting insert is rigidly clamped between said clamping nut means and said spindle means.

4,893,968

END MILL

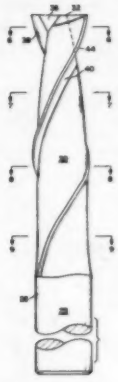
Zadok H. Levy, 114 Hagolan St., Tel-aviv, Israel

Filed Mar. 15, 1988, Ser. No. 168,153

Int. Cl.[4] B26D 1/12

U.S. Cl. 407—54 **8 Claims**

1. An end mill comprising a cylindrical rod having a smooth cylindrical shank portion of circular cross-section and an integrally formed cutting portion with at least one helical flute extending from the transition between said shank portion and said cutting portion to the end of said cutting portion, the



depth of grind of said flute being linearly tapered from a minimum depth proximate said transition to a maximum depth proximate said end of said cutting portion.

4,893,969

CUTTING INSERT AND METHOD FOR CHIP REMOVING MACHINING

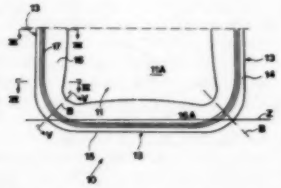
Anders B. I. Hessman, Sandviken, and Leif R. Nyström, Järbo, both of Sweden, assignors to Sandvik AB, Sandviken, Sweden

Filed Nov. 2, 1988, Ser. No. 265,898

Claims priority, application Sweden, Nov. 3, 1987, 8704280

Int. Cl.[4] B26D 1/00

U.S. Cl. 407—114 **9 Claims**



1. Indexable cutting insert for chip removing machining, comprising a rake face and a clearance face, a cutting edge being provided at the line of intersection of said faces, said rake face comprising at least two adjacent, elongated ridges which extend along at least a part of the cutting edge and wherein a first ridge connects to the cutting edge, characterized in that each ridge in cross-section at least partly describes a convex curve and in that a second ridge connects to the first ridge and is arranged below the first ridge such to become active after a substantial wear of the first ridge, the cutting insert being of polygonal basic shape having corner portions defining bisectors and in that major portions of the ridges are arranged beyond a first imaginary line intersecting the bisectors of two adjacent corner portions at the cutting edge of said corner portions.

4,893,970

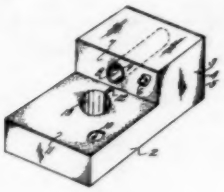
HAND HELD DRILL GUIDE

Charles E. Becraft, 1640 McKinley Ct., Eugene, Oreg. 97402

Filed Apr. 29, 1988, Ser. No. 188,022

Int. Cl.[4] B23B 49/02

U.S. Cl. 408—72 R 4 Claims



1. A drill guide for manual retention on a workpiece having right angular intersecting surfaces and comprising in combination,

a main body having first and second perpendicularly orientated faces,

said main body defining through openings one in each of said faces,

a wear resistant sleeve in one of said openings for receiving a drill and the other of said openings being for the viewing of a marking on the workpiece, and

grit friction enhancing means in place on said faces and engageable with the workpiece during guide use to inhibit movement of the guide.

4,893,971

NC MACHINING APPARATUS

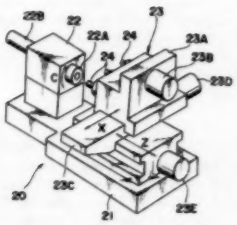
Takahiro Watanabe; Isao Matsumoto; Masakazu Suga, all of Hiroshima, and Toshimitsu Iwai, Kure, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Jan. 3, 1989, Ser. No. 293,006

Claims priority, application Japan, Jan. 20, 1988, 63-10092

Int. Cl.[4] B23C 1/14; G05B 13/00

U.S. Cl. 409—80 3 Claims



1. A machining apparatus for making the scroll parts which comprises a headstock means including a spindle for supporting a workpiece for rotation;

a tool holding means for supporting a machining tool;

a first carriage means supported for movement of the tool holding means in a direction perpendicular to the spindle (an X-axis);

a second carriage means supported for movement of the tool holding means in a direction parallel to the spindle; and

a control device for controlling the movement of the first carriage means and the rotation of the spindle;

said control device being programmed so as to calculate the distance x between the center of the base circle generating a desired involute curve depicted by the scroll parts and the center of the machining tool according to the following equation (I) and also to calculate the angle of rotation C of the spindle relative to the distance x according to the following equation (II):

$$x = \sqrt{a^2 + [a(\theta + \psi) + D/2]^2} \quad (I)$$

and

$$C = \theta - \tan^{-1}\{[a(\theta + \psi) + D/2]\}/a \quad (II)$$

wherein a represents the radius of the base circle generating the involute curve, θ represents the involute angle, Ψ represents the angle as measured between the X-axis and the starting point of the involute curve, and D represents the diameter of the machining tool.

4,893,972

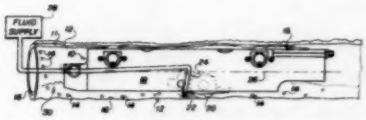
CUTTING TOOL

Lester J. Blaho, Monaca, Pa., assignor to Pittsburgh Tube Company, Monaca, Pa.

Filed Nov. 18, 1988, Ser. No. 273,275

Int. Cl.[4] B23D 1/24

U.S. Cl. 409—299 13 Claims



1. A cutting tool for removing upset from inside a tube and which does not force splatter into the inside surface of the tube comprising:

a holder;

means for enabling the tube to move along the holder, said enabling means connected to said holder and in contact with a bottom of the inside surface of the tube;

means for removing the upset from the inside surface of the tube, said removing means connected to the holder such that as the tube moves along the holder, the removing means removes the upset from the inside surface of the tube; and

means for preventing splatter from being forced into the inside surface of the tube by the enabling means as the tube moves along the holder by introducing fluid upstream from the enabling means to form a fluid barrier therewith which prevents splatter from being forced into the inside surface of the tube.

4,893,973

EXPANSION DOWEL WITH AXIALLY EXTENDING PROJECTIONS

Armin Herb, Apfeldorf, Fed. Rep. of Germany, assignor to Hilti Aktiengesellschaft, Fürstentum Liechtenstein, Liechtenstein

Filed Sep. 15, 1988, Ser. No. 245,131

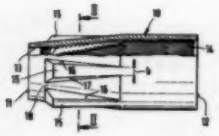
Claims priority, application Fed. Rep. of Germany, Sep. 15, 1987, 3730860

Int. Cl.[4] F16B 13/06

U.S. Cl. 411—55 9 Claims

1. Expansion dowel comprising an axially extending sleeve having a leading end to be inserted first into a borehole and a trailing end, said sleeve being at least partially axially slit from the leading end thereof, said sleeve having an outside surface and an inside surface with the inside surface forming an axially extending bore with the bore being threaded from the trailing end at least toward the leading end, at least an axially extending portion of said sleeve being conically shaped and diverging from the leading end toward the trailing end, the conically

shaped axially extending portion including axially extending conically-shaped outside surface sections diverging from the leading end toward the trailing end, said sleeve having axially extending projections extending outwardly from the axially extending outside surface sections thereof and located at least in the conically-shaped portion thereof, said projections spaced circumferentially apart by said outside surface sections,



said projections having at least one axially extending surface located outwardly from the outside surface and forming an outside planar surface inclined relative to the axis of said sleeve, said outside inclined planar surface having a leading end and a trailing end with the leading end thereof spaced from a line parallel to the central axis and passing through the trailing end thereof.

4,893,974

COMPOSITE PLUG FOR MOUNTING OBJECTS IN A DRILLED HOLE IN MASONRY

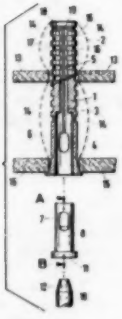
Artur Fischer, and Jörg Fischer, both of Waldachtal/Tumlingen, Fed. Rep. of Germany, assignors to Fischerwerke Artur Fischer GmbH & Co. KG, Waldachtal/Tumlingen, Fed. Rep. of Germany

Filed Jan. 9, 1989, Ser. No. 295,118

Claims priority, application Fed. Rep. of Germany, Jan. 14, 1988, 3800833

Int. Cl.[4] F16B *39/00, 39/02*

U.S. Cl. 411—82 **13 Claims**



1. A plug, comprising a plug body having a screw passage for receiving a mounting screw and an expanding region expandable by insertion of said mounting screw, said screw passage having a portion with an increased diameter, said plug body being provided with outlet openings for mortar introduced into said plug body; means forming guide surfaces in said screw passage, said guide surfaces leading to said outlet openings and subdividing said screw passage into a front region and a rear region, said outlet openings being located in said front region; means forming longitudinal channels extending along an outside of said plug body, said outlet openings merging into said longitudinal channels; and a stopper which is inserted in said portion of said increased diameter and formed as a hollow member, said stopper having openings which are in alignment with said outer openings.

4,893,975

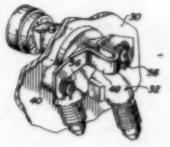
LOCKING DEVICE FOR ENGAGEMENT ONTO BOLT HEADS

William M. Anthony, Scottsdale, Ariz., assignor to Allied-Signal Inc., Phoenix, Ariz.

Filed Nov. 7, 1988, Ser. No. 268,312

Int. Cl.[4] F16B *39/02, 39/04*

U.S. Cl. 411—87 **13 Claims**



1. A locking device for securing against undesired loosening relative rotation a plurality of spaced apart threaded fasteners at least two in number each having an outwardly disposed torque-transmission surface and all generally in a planar array, at least two adjacent fasteners of said plurality of fasteners being without line-of-sight relationship therebetween, said locking device comprising a unitary deformably shape-retaining body, said body including a plurality of spaced apart fastener-engaging portions matching in number with and each encompassing a respective torque-transmission surface of one of said plurality of fasteners, each of said plurality of fastener-engaging portions defining cooperating interengageable means for when interengaged with a respective torque-transmission surface of a fastener preventing relative rotation therebetween, a respective connecting portion integral with and extending between each fastener-engaging portion and the next-adjacent fastener-engaging portion of said plurality of portions to prevent relative rotation thereof, the respective connecting portion extending between said two adjacent fasteners extending generally in the plane of said planar array parallel to but spaced laterally from a connecting line between said two adjacent fasteners, each connecting portion including a deformable section deformation of which changes the spacing between said adjacent fastener-engaging portions, and resilient means for removably securing said locking device into interengagement with said plurality of fasteners.

4,893,976

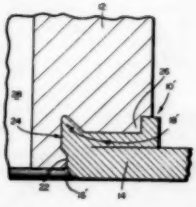
CLINCH TYPE FASTENING STRUCTURE

John S. Milliser, Rochester, Ind., and James T. McGuire, Royal Oak, Mich., assignors to Textron Inc., Providence, R.I.

Filed Mar. 1, 1988, Ser. No. 162,681

Int. Cl.[4] F16B *37/02, 37/04*

U.S. Cl. 411—180 **4 Claims**



1. A joint assembly in which a fastener of the self-clinching

type is secured to an apertured sheet material, comprising: a fastener including a head and shank portion with a locking groove formed in said shank; an apertured sheet material including a flanged circumferential periphery including an annular, bent-over portion thereof formed at the aperture to define engagement of dual layers of said peripheral material, wherein said fastener shank portion projects through said aperture and said fastener head is embedded within said bent-over portion of said peripheral material such that a portion of said peripheral material is disposed within said groove to form mechanical interlock therewith securing said joint assembly.

4,893,977

SELF-LOCKING UNIT

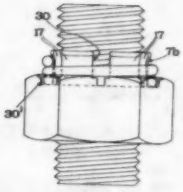
Giancarlo Tramezzani, Ponte Tresa, Switzerland, assignor to Alian International AG, Triesen, Liechtenstein

Division of Ser. No. 208,833, Jun. 20, 1988, abandoned, which is a continuation of Ser. No. 938,345, Dec. 3, 1986, abandoned, which is a continuation of Ser. No. 673,129, Nov. 16, 1984, abandoned. This application Jul. 25, 1989, Ser. No. 385,923

Claims priority, application Italy, Jan. 16, 1984, 52838[U]

Int. Cl.[4] F16B *39/22*

U.S. Cl. 411—278 **2 Claims**



1. A self-locking nut assembly, comprising a nut including a main body and an internally threaded annular collar upwardly extending from said main body and being integral therewith, said main body having an upper face facing said collar and formed with a substantially circular recess; and a helical spring supported in said circular recess and extending upwardly therefrom to surround said collar, said collar being provided with a plurality of circumferentially spaced vertically extending slots defining therebetween a plurality of arcuate segments compressed by said helical spring, said main body being formed in said upper face with a plurality of circumferentially spaced-apart longitudinal slots being in radial alignment and in communication with said slots of said collar and formed radially outwardly from said slots of said collar and forming therewith continual slots, each of said continual slots having at said upper face of said main body in a non-screwed and non-compressed position of said nut a width which is smaller than the width of said continual slots at an open end thereof at said collar so as to enable automatic expulsion of dirt accumulating in said collar slots during tightening or loosening the nut assembly on a screw, each continual slot being of a double U-shape, comprising a narrow U-shape and a wide U-shape, said narrow U-shape extending upwardly from said main body into said wide U-shape, said wide U-shape extending to said open end.

4,893,978

QUARTER-TURN DETENT TWISTLOCK

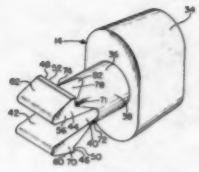
Francis G. Frano, Hoffman Estates, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Feb. 9, 1989, Ser. No. 307,918

Int. Cl.[4] F16B *21/00*

U.S. Cl. 411—553 **6 Claims**

1. A twistlock fastener comprising a latching member and a base member, said base member having a socket portion with a square-shaped internal bore, said latching member comprising a head portion and a shank portion, said shank portion having a cylindrical section with one end adjacent to said head portion and a pair of resilient leg elements connected to the other end of said cylindrical section, each of said leg elements including a latching shoulder, said shoulders extending in opposite radial directions from an axis of said shank portion, the length of said shoulder across each leg element being slightly less than the length of a side wall of said square-shaped bore, each of said shoulders being of a width in said radial directions sufficient to



retain said shank portion in said square-shaped bore, opposite side surfaces of said leg elements each lying in a common flat plane perpendicular to and at opposite ends of said shoulders, the surface on each of said leg elements which extends axially from said shoulder at an intermediate location being flat and being perpendicular to said common flat planes, and corner surfaces formed along and adjacent to each of said opposite side surfaces being rounded to permit the rotation of said latching member relative to said base member.

4,893,979

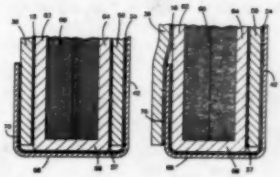
SUPPLEMENTAL BOOK COVER

Fred W. Alpers, 12485 Rockhaven Rd., Chesterland, Ohio 44026

Continuation-in-part of Ser. No. 162,276, Feb. 29, 1988, abandoned. This application Jun. 19, 1989, Ser. No. 368,970

Int. Cl.[4] B42C *17/00*; D42D *3/00*

U.S. Cl. 412—4 **9 Claims**



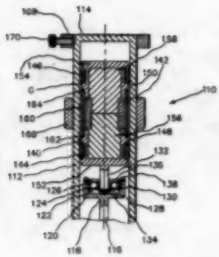
1. A method for reinforcing a book with a spine, a first cover and a second cover, comprising the steps of: removing a first liner from a portion of an adhesive-backed stiff first sheet; adhering the thereby exposed portion to the second cover; removing a second liner from the remainder of the first sheet; adhering the thereby exposed portion to the second cover; removing a third liner from a flexible region of the second sheet; adhering a part of the thereby exposed flexible region to the spine and the remaining part of the flexible region to the first sheet; and removing a fourth liner from a stiff region of an adhesive-backed second sheet; and adhering the thereby exposed stiff region to the first cover.

4,893,980

DEVICE FOR MOVING OBJECTS WITHIN A SEALED CHAMBER

Valentin Balter, Cupertino, Calif., assignor to Huntington Mechanical Laboratories, Inc., Mountain View, Calif.

Filed Dec. 19, 1988, Ser. No. 286,602
Int. Cl.[4] B25J *1/00*
U.S. Cl. 414—3 **20 Claims**



1. A sample transfer device for moving objects within a sealed chamber, comprising:

a tubular housing closed at one end thereof and open at the other end thereof for attaching said housing to a sealed chamber;

an elongated member located in said housing, said elongated member being moveable axially inside said housing, said elongated member having one end located near said closed end of said housing, and a second end being capable of protruding from said housing into said sealed chamber;

a translatory motion unit having a drive member located outside said housing and moveable axially along said housing, and a driven member located inside said housing, said driven member being rigidly connected to said first end of said elongated member, said drive member of said translatory motion unit having contactless positive connection with said driven member, said driven member being located and fixed inside a sealed hollow body; and

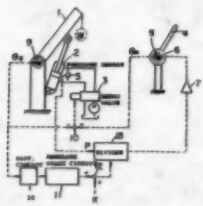
means for centering and guiding said hollow body in said housing.

4,893,981

MASTER/SLAVE TYPE MANIPULATOR

Hiroshi Yoshinada, Machida, and Shu Takeda, Hiratsuka, both of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Mar. 26, 1987, Ser. No. 30,887
Int. Cl.[4] B25J *3/04*
U.S. Cl. 414—5 **4 Claims**



1. A master/slave type manipulator, comprising:

slave means in the form of a working machine operated by a first actuator;

master means in the form of a control level similar to said working machine and having a second actuator for providing a torque to said control lever in a direction opposite to an operating direction of the control lever;

a first position sensor for detecting an actuated position of the working machine;

a second position sensor for detecting an operated position of the control lever;

first driving means for driving said first actuator to make zero a difference between outputs of said first and second position sensors;

means for detecting a load acting on the working machine; and

second driving means for driving said second actuator in accordance with an output of said load detecting means, wherein said second driving means comprises:

calculating means for differentiating said output of the first position sensor and dividing an output of said load detecting means by an absolute value of said differentiated value and;

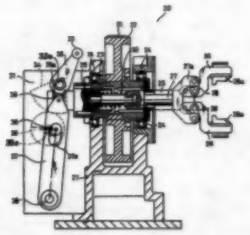
means for driving said second actuator in accordance with an output of said calculating means.

4,893,982

APPARATUS FOR CONVEYING WORKPIECE

Takaharu Yamaguchi, Toyokawa, Japan, assignor to Taiho Seiki Co., Ltd., Toyota, Japan

Filed Dec. 28, 1987, Ser. No. 138,727
Claims priority, application Japan, Sep. 17, 1987, 62-233321; Sep. 17, 1987, 62-233322
Int. Cl.[4] B65G *65/08*
U.S. Cl. 414—753 **31 Claims**



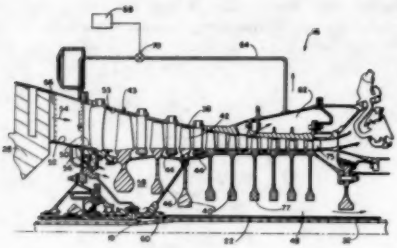
18. An apparatus for conveying a workpiece comprising:

(a) at least one workpiece holder movably between a workpiece receiving position and a workpiece discharging position, said at least one workpiece holder comprising a workpiece clamping mechanism movable between a workpiece clamping position and a workpiece releasing position;

(b) a clamp reversing device for each said at least one workpiece holder for movement therewith between said receiving position and said discharging position, said clamp reversing device being actuable for moving said workpiece clamping mechanism between said workpiece clamping position and said workpiece releasing position; and

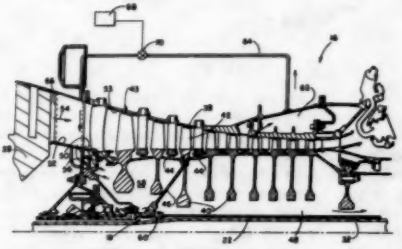
(c) means for actuating each said clamp reversing device by engagement therewith, said means for actuating said clamp reversing device comprising a driven member for engaging said clamp reversing device and being located at each of said workpiece receiving position of said apparatus and said workpiece discharging position of said apparatus.

4,893,983
CLEARANCE CONTROL SYSTEM
William F. McGreehan, Westchester, Ohio, assignor to General Electric Company, Cincinnati, Ohio
Filed Apr. 7, 1988, Ser. No. 178,734
Int. Cl.[4] F01D 17/00
U.S. Cl. 415—48 12 Claims



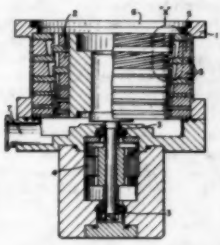
1. A system for controlling the temperature of a rotor of a turbomachine comprising:
means for supplying a heat transfer fluid flow (w_b) to said rotor;
means for varying the temperature of w_b; and
means for controlling said varying means as a function of the heat carrying capacity of w_b.

4,893,984
CLEARANCE CONTROL SYSTEM
Samuel H. Davison, Milford, and William F. McGreehan, Westchester, both of Ohio, assignors to General Electric Company, Cincinnati, Ohio
Filed Apr. 7, 1988, Ser. No. 178,721
The portion of the term of this patent subsequent to Jan. 16, 2004, has been disclaimed.
Int. Cl.[4] F01D 17/00
U.S. Cl. 415—48 19 Claims



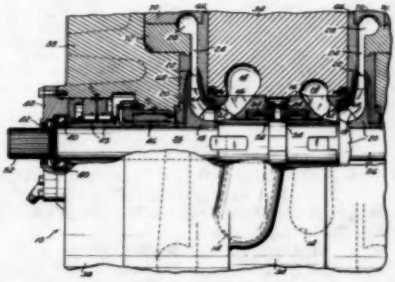
1. A system for controlling the temperature of a rotor of a turbomachine comprising:
means for supplying a cooling fluid to said rotor;
means for supplying a heating fluid to said rotor; and
means for controlling only the flow of said heating fluid.

4,893,985
MULTI-STAGE MOLECULAR PUMP
Kurt Hölss, Huettenberg, Fed. Rep. of Germany, assignor to Arthur Pfeiffer Vakuumtechnik Wetzlar GmbH, Asslar, Fed. Rep. of Germany
Filed Aug. 15, 1988, Ser. No. 232,499
Claims priority, application Fed. Rep. of Germany, Aug. 24, 1987, 3728154
Int. Cl.[4] F01D 1/36
U.S. Cl. 415—90 11 Claims



1. A molecular pump for handling gases comprising a rotor and a stator which are disposed concentrically to one another, the rotor being inside the stator, wherein rotor (2) and stator (5) each consist of a plurality of portions (8,9; 10,11) which together form a plurality of pump stages and each pump stage is in turn composed of various pump sections, wherein the rotor (2) consists alternately of portions (8) which are provided with helical grooves at the outside, and of portions (9) the outer surfaces of which are smooth.

4,893,986
HIGH-PRESSURE HIGH-TEMPERATURE COAL SLURRY CENTRIFUGAL PUMP AND LET-DOWN TURBINE
Fritz C. Catterfeld, and George S. Wong, both of Los Angeles, Calif., assignors to Rockwell International Corporation, El Segundo, Calif.
Continuation of Ser. No. 88,884, Oct. 29, 1979, abandoned, which is a continuation-in-part of Ser. No. 33,085, Apr. 25, 1979, abandoned. This application Sep. 30, 1985, Ser. No. 783,045
Int. Cl.[4] F03C 13/00; F04D 1/06, 7/04
U.S. Cl. 415—100 20 Claims



1. A centrifugal pump for an abrasive slurry comprising:
a unitary pump housing;
an inlet means and an outlet means located through the periphery of the pump housing and substantially transverse to an axis of the pump;
two end plates detachably connected to said pump housing for enhancing on-line maintenance of said pump;

a pump shaft axially located between and supported by said end plates;

an impeller coaxially located on said pump shaft for increasing momentum energy of an abrasive slurry passing therethrough;

means for circumferentially directing fluid flow, said means being located along the interior wall of said pump housing for turning fluid flow in the direction of impeller rotation and reducing inlet relative velocity at the impeller inlet and primarily at the impeller inlet tip diameter, said means comprising pre-rotator vanes located along the interior wall of said pump housing;

a wall in said housing disposed about the periphery of said impeller defining a vaneless radial diffuser means to receive the output of abrasive slurry from said impeller and reduce its velocity a sufficient amount to inhibit abrasive erosion of downstream surfaces, said diffuser means comprising replaceable abrasive-resistant inserts which form an inner surface of said diffuser means which is exposed to the abrasive slurry;

an arcuate fold-over volute extending substantially continuously about the periphery of said wall defining said diffuser means;

a cutwater interposed in an opening in said wall between said diffuser means and said volute for directing abrasive slurry from said diffuser means tangentially into said volute and;

means for sealing and supporting said pump shaft wherein said sealing and supporting means is coaxially positioned along said pump shaft and interposed said impeller and said end plates for preventing leakage of said slurry and for providing bearing means for said shaft.

4,893,967

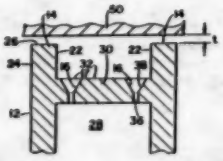
DIFFUSION-COOLED BLADE TIP CAP

Ching P. Lee; Eugene T. Vaughn, both of Cincinnati, and Nicholas C. Palmer, Loveland, all of Ohio, assignors to General Electric Company, Cincinnati, Ohio

Filed Dec. 8, 1987, Ser. No. 130,597

Int. Cl.[4] F01D *5/18*

U.S. Cl. 416—92 **36 Claims**



1. A gas turbine engine cooled turbine blade tip comprising:

an endwall having at least one diffusion cooling hole for passing cooling flow therethrough.

4,893,988

SYSTEM FOR DAMPING LEAD-LAG MOTION OF ROTOR BLADES OF HELICOPTER

Tetsuro Sato, Tokyo, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 10, 1988, Ser. No. 269,365

Claims priority, application Japan, Nov. 10, 1987, 62-283742

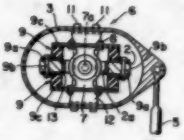
Int. Cl.[4] B64C *27/38*

U.S. Cl. 416—140 **6 Claims**

1. A system for damping lead-lag motion of rotor blades of a helicopter, which comprises a central mast rotated by a power source, at least two flexbeams each connected with the central mast at an inboard portion thereof to rotate about the rotational axis of the central mast and secured to one of the rotor blades at an outboard end thereof, pitch sleeve means secured at one end thereof to the rotor blade to enclose each of the flexbeams, said pitch sleeve means having a substantially elliptical cross section, pitch change means for changing the pitch of the rotor blades by moving the pitch sleeve means, and damping means for damping the lead-lag motion of the rotor blades, wherein the damping means comprises:

at least one torque arm coupled with the pitch sleeve means at upper and lower sides of the pitch sleeve means;

an elastomeric pivot having at least one central shaft supported by the torque arm, said elastomeric pivot also having upper and lower extensions; and



elastomeric dampers mounted on upper and lower surfaces of each of the flexbeams at one end portions thereof and fastened to the upper and lower extensions of the elastomeric pivot at the other end portions thereof, respectively, to damp the lead-lag motion of the rotor blade so as to prevent changing of relative positional relationship between the pitch sleeve means and the elastomeric pivot even when change of relative positional relationship occurs between the flexbeam and the pitch sleeve means by the operation of the pitch change means.

4,893,989

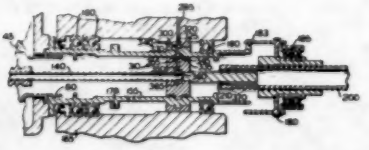
VARIABLE PROPELLER SYSTEM INCORPORATING A FORWARD TRANSFER BEARING

Paul A. Carvalho, Westfield, Mass., assignor to United Technologies Corporation, Hartford, Conn.

Filed Mar. 7, 1989, Ser. No. 320,690

Int. Cl.[4] B63H *3/08*

U.S. Cl. 416—157 R **6 Claims**



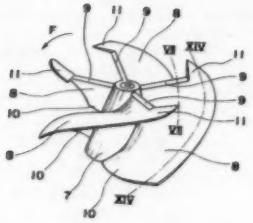
1. In a variable pitch propeller system having a rotating side and a stationary side, the rotating side comprising a hub mounting a plurality of variable pitch propeller blades, a drive shaft, a transfer tube disposed within said drive shaft and rotatable relative thereto, and a hydromechanical pitch change mechanism, the stationary side having a controller and a housing, and a transfer bearing, the controller having a rotatable portion for receiving the transfer tube and imparting rotatable pitch change signals thereto, wherein the improvement comprises:

means for transferring hydraulic fluid from said housing through said drive shaft and through said transfer tube while allowing relative rotation between said housing and said drive shaft and between said drive shaft and said transfer tube, said means being disposed forward of said rotatable portion of said controller.

4,893,990
MIXED FLOW IMPELLER

Teruhiko Tomohiro, Nara, and Masahiro Atarashi, Kusatsu, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Oct. 5, 1988, Ser. No. 253,861
Claims priority, application Japan, Oct. 7, 1987, 62-252877
Int. Cl.[4] F24F *11/04, 11/02*
U.S. Cl. 416—228 8 Claims

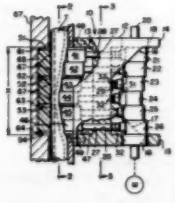


1. A mixed flow impeller which comprises a hub portion of a generally truncated conical shape, and a plurality of blade members secured to a peripheral portion of said hub portion, each of said blade members being arranged to be generally in a straight line shape at its leading edge portion as viewed in a direction of a rotary axis thereof, and having an approximately arcuate shape in a cross section at said leading edge portion, with a thickness larger than that of said blade member.

4,893,991
METHOD AND MEANS FOR IMPROVING EFFICIENCY OF PERISTALTIC PUMPS

James F. Hemingway, 10899 W. Shelby, Medina, N.Y. 14103, and Eric P. Freischlag, 4281 Chestnut Rd., Wilson, N.Y. 14172

Continuation of Ser. No. 55,982, May 27, 1987, abandoned. This application Oct. 19, 1988, Ser. No. 262,205
Int. Cl.[4] F04B *43/12, 45/08*
U.S. Cl. 417—53 9 Claims



1. A method of improving the efficiency of peristaltic pumps of the type which utilize a plurality of reciprocable fingers for repeatedly contracting a section of flexible tubing at a point, and moving the point of contraction unidirectionally and cyclically along the tube section to force fluid along the tube section in front of the contraction, comprising

mounting a section of flexible, generally cylindrical tubing having a bore in a peristaltic pump, said section being in operative relation to said fingers,

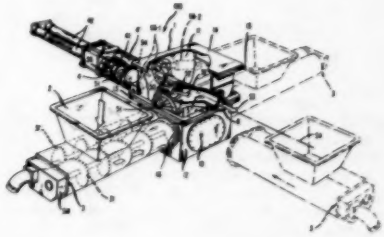
partially constricting said tubular section so that each portion of said tubular section is compressed along its length, and

causing said fingers repeatedly to compress and release said partially constricted tubular section by cyclically urging said fingers successively and one after the other into extended positions in which each finger substantially closes the bore at a point along said tubular section and retracted positions in which each member is drawn away from said tubular section but only far enough to permit said tubular section to assume a generally oval configuration in cross section without permitting any portion of said section to return to its generally cylindrical configuration, whereby the drop in the flow rate of said pump, during operation thereof, is maintained in a range of approximately +2% to 0% by preventing any portion of said section from returning to its generally cylindrical configuration during reciprocation of said fingers.

4,893,992
TWO-CYLINDER THICK-MATERIAL PUMP

Karl Schlecht, Stuttgart, Fed. Rep. of Germany, assignor to Putzmeister-Werk Maschinenfabrik GmbH, Aichtal, Fed. Rep. of Germany

Filed Jun. 24, 1988, Ser. No. 210,849
Claims priority, application Fed. Rep. of Germany, Jun. 27, 1987, 3721248
Int. Cl.[4] F04B *19/00, 39/10*
U.S. Cl. 417—238 18 Claims



10. A two-cylinder, thick material pump with a pipe switch tiltably disposed in a hopper and alternatingly connecting transport cylinders with a transport line and with a pre-compression unit flanged to a wall of the hopper and comprising at least one conveyor worm wherein the improvement comprises that the hopper is provided at several locations with openings (16), which can be covered or at which the pre-compression unit (3) can be flanged on as desired.

4,893,993
LUBRICATION SYSTEM FOR A REFRIGERANT COMPRESSOR

Keiichi Shimizu, Isesaki, Japan, assignor to Sanden Corporation, Gunma, Japan

Filed Aug. 3, 1987, Ser. No. 80,610
Claims priority, application Japan, Aug. 1, 1986, 61-118789[U]
Int. Cl.[4] F04B *1/14*
U.S. Cl. 417—269 7 Claims

1. A slant plate refrigerant compressor for use in a refrigerant circuit comprising:

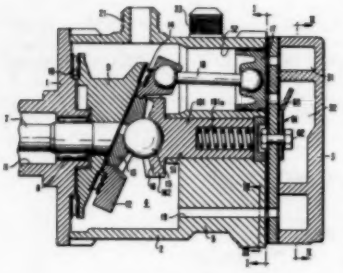
a compressor housing having a cylinder block which is provided with a plurality of cylinders, the inner wall surface of said housing forming the outer wall of a crank chamber which is adjacent to said cylinder block, said housing haveing a plurality of housing fastener holes for receiving a fastener;

a front end plate disposed on one end of said housing;

a rear end plate disposed on the other end of said housing adjacent said cylinder block, said rear end plate including a discharge chamber disposed at its center, and a suction chamber disposed around said discharge chamber, said rear end plate having a plurality of end plate fastener holes for receiving a fastener, said end plate fastener holes being aligned with said housing fastener holes;

a piston slidably fitted within each of said cylinders;

a drive mechanism disposed in said crank chamber and coupled to said pistons to reciprocate said pistons within said cylinders, said drive mechanism including a drive shaft rotatably supported in said housing, a rotor coupled to said drive shaft and rotatable therewith, and coupling means for drivingly coupling said rotor to said pistons such that the rotary motion of said rotor is converted into reciprocating motion of said pistons, said coupling means including a member having a surface disposed at an incline angle relative to said drive shaft;



an inlet port formed on said housing to provide fluid communication directly into said crank chamber from the external refrigerant circuit; and

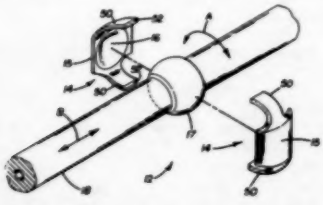
a plurality of communication holes formed through an outer portion of said cylinder block and extending from a location adjacent said outer wall of said crank chamber to said suction chamber to provide communication therebetween, said communication holes being formed spaced from and independent of said housing fastener holes and said end plate fastener holes, to thereby reduce refrigerant pressure loss.

4,893,994

GUIDE ASSEMBLY AND GUIDE SHOE FOR A VARIABLE ANGLE WOBBLE PLATE COMPRESSOR

Carl A. Copp, Vandalia, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed May 25, 1989, Ser. No. 356,494
Int. Cl.[4] F04B 1/14
U.S. Cl. 417—269 **4 Claims**



1. An improved guide assembly for a variable displacement axial compressor, said compressor including a wobble plate and a stationary guide rod in operative engagement with said wobble plate for preventing rotation of said wobble plate, comprising:

guide bearing means slidingly engaged on said guide rod; and

at least a pair of guide shoes for engaging said wobble plate, said guide shoes being slidably mounted on said guide bearing means, said guide shoes further including positioning means having substantially juxtaposed bearing surfaces for distributing load and substantially maintaining the relative position of said guide shoes during compressor operation;

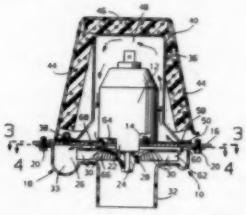
whereby guide shoe friction and wear against the guide rod is prevented and an increase in efficiency of the compressor is provided.

4,893,995

ELECTRIC MOTOR-DRIVEN IMPELLER-TYPE AIR PUMP

Gibson O. Hufstader, Utica, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Dec. 5, 1988, Ser. No. 280,044
Int. Cl.[4] F04D 29/28
U.S. Cl. 417—370 **3 Claims**



1. An air pump having an electric motor secured to one side of a mounting plate, and a housing secured to the opposite side of said plate, said motor having a shaft that extends into a working chamber defined between said plate and said housing, said shaft supporting and driving an impeller in said chamber to centrifugally induce air flow through said chamber, wherein a cover is secured to said plate and encloses said motor in a sealed chamber defined between said cover and said plate, said plate has a series of peripherally spaced apertures opening to said sealed chamber from the high pressure zone of said working chamber near the outer rim of said impeller, said plate also has a series of peripherally spaced apertures opening from said sealed chamber to a central low pressure zone of said working chamber between said plate and the back of said impeller, and said impeller induces a portion of the air flow to recirculate from said high pressure zone through said sealed chamber, about said motor and into said low pressure zone to cool said motor.

4,893,996

INTERENGAGING ROTOR DEVICE WITH LUBRICATION MEANS

William Lorna, 100 Thorndale Dr., #356, San Rafael, Calif. 94903, and Merritt A. Robinson, 475 Fawn Dr., San Anselmo, Calif. 94960

Division of Ser. No. 79,704, Jul. 30, 1987, abandoned, which is a division of Ser. No. 252,811, Oct. 3, 1988, Pat. No. 4,848,295.
This application May 26, 1989, Ser. No. 357,185
Int. Cl.[4] F04C 29/02
U.S. Cl. 418—99 **2 Claims**

1. An interengaging rotary device comprising:

a housing;

a pair of meshing rotors mounted for rotation in said housing;

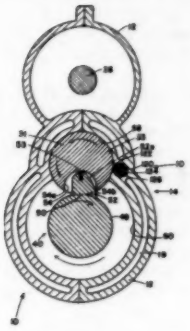
said rotors having tangentially engaging circular bodies;

a work chamber in said housing, said work chamber having a pair of circular portions, each closely but rotatably receiving one of said rotors;

a cylindrical lubrication gallery in said housing adjacent and generally parallel to one of said circular portions of the work chamber;

a source of pressurized lubricant in communication with said lubrication gallery;

a series of small lube passageways extending between said lubrication gallery and said one circular portion;



a lubrication shaft rotatably received in said lubrication gallery;

a narrow helical groove around said lubrication shaft; and

means rotating said lubrication shaft in timed relation to said rotors.

4,893,997

INTERNAL-GEAR MACHINE

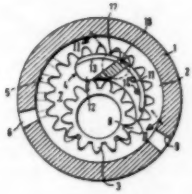
Otto Eckerle, Malsch, Fed. Rep. of Germany, assignor to Otto Eckerle GmbH & Co. KG, Malsch, Fed. Rep. of Germany

Filed Jul. 1, 1988, Ser. No. 214,194

Claims priority, application Fed. Rep. of Germany, Jul. 16, 1987, 3723557

Int. Cl.[4] F04C *1/06, 15/00*

U.S. Cl. 418—126 **13 Claims**



1. An internal-gear machine comprising:

a casing;

an internally toothed annular gear in the casing;

an externally toothed pinion disposed within the annular gear and meshing with a portion of the annular gear, a clearance being provided between said pinion and the remaining portion of the annular gear;

a filling member of a configuration generally corresponding to half a sickle shape so as to taper from a first end towards a second end thereof and having circumferential faces and side surfaces, the filling member being disposed in said clearance and extending substantially in the circumferential direction of the annular gear with said circumferential faces thereof in contact with the tips of the teeth on the pinion and on the annular gear and partitioning said clearance into an intake chamber on the side of said first end and a pressure chamber on the side of said second end, said filling member having a groove formed in a side surface thereof;

means supporting said filling member on said casing rotatably and displaceably therein, said supporting means comprising mounting pin means mounted rotatably in a bore in said casing, and a mounting portion carried on said mounting pin means in projecting relationship therefrom, said mounting portion being received in said groove in the side surface of said filling member, said mounting pin means being disposed at a spacing away from said first end of said filling member, towards said second end thereof.

4,893,998

INSTALLATION FOR PRODUCING A FIBER OPTIC CABLE COMPONENT

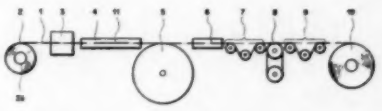
René Schlaeppi, Prilly, and Rémy Bruggman, Brent, both of Switzerland, assignors to Maillefer S.A., Ecublens, Switzerland

Division of Ser. No. 804,119, Dec. 3, 1985, Pat. No. 4,772,435. This application May 23, 1988, Ser. No. 197,314

Claims priority, application Switzerland, Dec. 14, 1984, 5966/84

Int. Cl.[4] B29C *47/88;* **B29D** *11/00*

U.S. Cl. 425—114 **2 Claims**



1. An installation for producing a fiber optic stranding element formed of at least one light-waveguide component loosely encompassed in at least one sheath, said installation comprising:

at least one payout reel for holding at least one light-waveguide component,

an extrusion head located downstream of said at least one payout reel for forming at least one sheath loosely encompassing said at least one light-waveguide component to form said stranding element,

braking means associated with said at least one payout reel for regulating the tension of said at least one light-waveguide component,

cooling means for cooling said at least one sheath, said cooling means being located downstream of said extrusion head and including a first vat for cooling said at least one sheath to a first temperature T_1 and a second vat for cooling said at least one sheath to a second temperature T_2 lower than said temperature T_1,

main withdrawal means for simultaneously pulling said at least one light-waveguide component through said extrusion head and said stranding element through said first vat,

auxiliary withdrawal means for pulling said stranding element through said second vat with as low a tractive force as possible,

at least one takeup reel disposed downstream of said auxiliary withdrawal means for receiving and storing said stranding element, and

means for driving said at least one takeup reel.

4,893,999

APPARATUS FOR THE CONTINUOUS PRODUCTION OF POLYMERS AND COPOLYMERS OF WATER-SOLUBLE MONOMERS

Miroslav Chmelir, Krefeld, and Josef Pauen, Willich, both of Fed. Rep. of Germany, assignors to Chemische Fabrik Stockhausen GmbH, Krefeld, Fed. Rep. of Germany

Division of Ser. No. 942,330, Dec. 16, 1986, Pat. No. 4,857,610. This application Sep. 24, 1987, Ser. No. 225,983

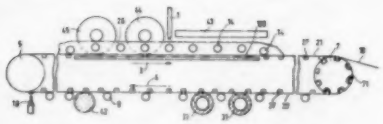
Claims priority, application Fed. Rep. of Germany, Dec. 18, 1985, 3544770

Int. Cl.[4] B29D *7/00*

U.S. Cl. 425—174.4 **8 Claims**

1. In an apparatus for the continuous production of polymers

and copolymers of water-soluble monomers, if desired with additional comonomers, said production of polymers and copolymers comprising producing polymer gel strands by polymerization of an aqueous monomer solution optionally containing catalysts and/or photoinitiators, the monomer solution being applied in a layer at least one centimeter thick on a moving endless conveyor belt and thereafter polymerized, the apparatus comprising an endless moving conveyor belt having an upper and lower run, an upper surface, and side edges, an endless conveyor means, at least two guide rollers for the conveyor belt, at least one of which guide rollers is driven and one of which is adjustable, horizontal conveyor belt support elements, and optionally a dispensing means for delivering to the upper surface of the conveyor belt a stretched separation sheet capable of being carried along with the conveyor belt, and a delivery and metering means for the monomer solution, as well as optionally irradiating means, which irradiating means is located upstream of the dispensing and metering



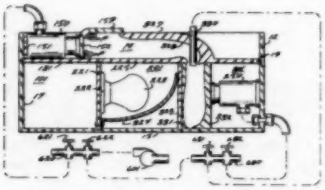
means, cooling and heating means, and a removal means for the polymer gel strand formed, which removal means is located adjacent to the guide roller or guide rollers for the conveyor belt, wherein the improvement comprise, (a) upwardly extending support elements (14) on both sides of the conveyor belt (2) in the region of the upper run (21) of the conveyor belt (2), beginning in the region of the dispensing and metering means (1), the upwardly extending support elements (14) having axes (140) intersecting one another at a point below the upper run (21) of the conveyor belt, the side edges of the conveyor belt being vertically supported by the upwardly extending support elements (14) thereby forming a trough shape across the width of the conveyor belt and (b) at least one pressure-roller (44, 45), upstream of the dispensing and metering means (1) to prevent backflow of the monomer solution, said pressure-roller (44, 45) having the profile of the trough formed in the conveyor belt run (21), being adjacent to the upper surface thereof and being located parallel to the horizontal support elements.

4,894,000

MOLDING SYSTEM

Richard C. Coates, Jr., 505 Joy La., Dundee, Ill. 60118

Filed Nov. 19, 1987, Ser. No. 122,385
Int. Cl.[4] B29C *69/00, 49/04*
U.S. Cl. 425—190 **6 Claims**



1. An assembly useful in heating thermoplastic stock and forming plastic articles therefrom, said assembly comprising:

a substantially rectangular housing defined by a back wall, a bottom wall and a front wall pivotally attached to said bottom wall, said walls extending between a first and second end wall, said walls cooperatively combining to form a common interior cavity, the interior surfaces of said first and second end, bottom and front end walls each including a plurality of grooves aligned in a series of planes transverse to the corresponding walls;

a plurality of separator plates each defined by a peripheral edge received in aligned ones of said grooves at said peripheral edges thereof;

heating means attached to a selected one of said separator plates;

an air pump including an air inlet and an air outlet;

a plurality of air cylinders inserted in said interior cavity adjacent said first end wall;

manifold means for selectively connecting said outlet of said air pump to said air cylinders;

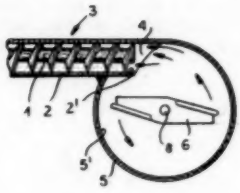
suctions means selectively connected to said inlet of said air pump and deployed to produce suction in a selected portion of said cavity between said second end wall and the adjacent one of said separator plates; and forming means received in said grooves and aligned to receive said thermoplastic stock to form said articles therefrom.

4,894,001

APPARATUS FOR PROCESSING SYNTHETIC THERMOPLASTIC MATERIAL

Goetz Petschner, Zollikon, Switzerland, assignor to Indupack AG, Zug, Switzerland

Filed Oct. 5, 1988, Ser. No. 254,387
Int. Cl.[4] B29C *47/60*
U.S. Cl. 425—200 **1 Claim**



1. An apparatus for processing synthetic thermoplastic material comprising:

a receiving container having an axis running along a longitudinal direction thereof, said container defined by a wall and having an opening therein;

a disintegrating-blending member disposed near a bottom of said receiving container and rotatable about said axis; and

a screw extruder comprising a screw within a cylinder, said cylinder having a front-end charging opening being in flow connection with said opening in said wall, said cylinder at its front-end charging opening intersecting said wall at a tangent thereto, said cylinder having a guiding wall forming part of said front-end charging opening extending at least partially into said receiving container opposing rotational flow in said receiving container to achieve deflection of synthetic thermoplastic material into said cylinder.

4,894,002

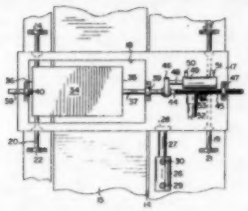
APPARATUS FOR CONFIGURING AN EXTRUDATE

E. Terry Groff, 3011 Leisz's Bridge Rd., Muhlenberg Park, Reading, Pa. 19605

Filed Aug. 1, 1988, Ser. No. 226,454
Int. Cl.[4] A21C *3/08*
U.S. Cl. 425—319 **7 Claims**

1. Apparatus for configuring an extrusion of food, comprising an extruder discharging downwardly, a support beneath

said extruder for receiving extrudate, the support having an upper side and an underside, support and extruder mounting means mounting the same for relative movement in a selected path to selectively configure the extrudate on the upper side of the support, additional support mounting means mounting said



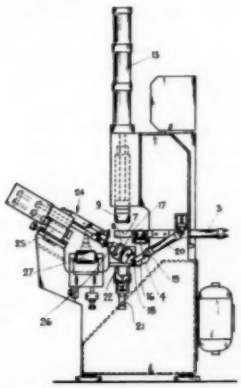
support for overturning movement to gravitationally remove the configured extrudate from the support and present the underside of the support upwardly toward the extruder for further receiving extrudate, and a receiver beneath said support for receiving the gravitationally removed configured extrudate.

4,894,003

CONTROL SYSTEM FOR MOLDING MACHINES OF PASTY PRODUCTS

Ottorino Pisoni, Busto Arsizio, Italy, assignor to Meccaniche Moderne S.r.l. Chemical Plants Division, Busto Arsizio, Italy

Filed Jun. 1, 1988, Ser. No. 201,479
Int. Cl.[4] B29C *33/30*
U.S. Cl. 425—399 **4 Claims**



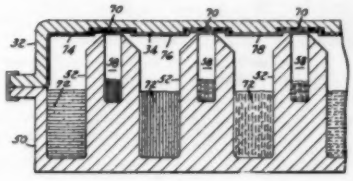
1. A machine for molding a piece of a pasty product which comprises a conveyor belt (4) for said piece (5) to be molded, gripping means for said piece comprising a fork (2), a rear pneumatic piston (3) connected to said fork (2), said fork being aligned with said belt (4), a pusher (6) at the free end of said fork, adjustable jaws (7), a lower fixed die (8) and a mobile upper mold (9) aligned with said pusher; said lower die being fixed to pins (17), said jaws being aligned with said fixed die (8) and with said upper mobile mold (9), said conveyor belt (4) stopping when said piece (5) reaches the position of alignment with said fork and said rear piston (3) pushes said fork forward, said pusher pushing said piece between said jaws, and said piece is molded between said die (8) and said mold (9), a centering device for said lower die (8), said centering device comprising a bolt (14), a pneumatic piston (21) driving said bolt, said bolt in forward position engaging in a corresponding seat (15) formed on at least one first side lever (16) connected to said pins (17), said centering device fixing the lower die (8) when in alignment position with the upper mobile mold (9), extraction means (24) for extracting said bolt (14) after the molding operation is complete, said extraction comprising a pneumatic control piston (25) and suckers (26) fixed to the free end of the rod of said piston, a device for rotating said lower die (8) comprising at least one second side lever (16) fixed to said lower die (8) and supported at the end of a rod (19) of a pneumatic piston (20), said piston driving the lateral displacement of said second lever; said displacement causing the rotation of the die from alignment position with the upper mold (9) and with the extractor means (24) and vice versa.

4,894,004

APPARATUS FOR MOLDING MULTI-COLORED PLASTIC SHELLS

Alfred F. Brault, South Berwick, Me., assignor to Davidson Textron Inc., Dover, N.H.

Filed Nov. 4, 1988, Ser. No. 267,356
Int. Cl.[4] B28B *7/24, 1/16, 1/20*; B29C *39/12*
U.S. Cl. 425—435 **4 Claims**



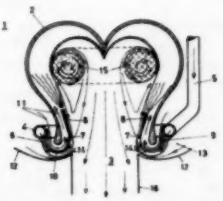
1. In a mold and powder box assembly connected together by suitable clamp means, and wherein the mold includes a casting surface having a plurality of raised alternate surfaces and recesses having spaced wall portions and a bottom, a powder box comprising a housing, spaced dams mounted in the housing providing compartments therebetween and adapted to carry thermoplastic powder in each compartment, means for connecting said powder box to said mold for aligning each dam adjacent one of said recesses, each dam having a length which provides a predetermined clearance gap between said dam and said one of said recesses and a hollow section formed in the end of each dam adjacent the longitudinal central portion of each recess.

4,894,005

COMBUSTION CHAMBER ARRANGEMENT WITH A PRE-COMBUSTION CHAMBER FOR SUBSTOICHIOMETRIC COMBUSTION

Jakob Keller, Dottikon, Switzerland, assignor to BBC Brown Boveri AG, Baden, Switzerland

Filed Jun. 18, 1987, Ser. No. 63,480
Claims priority, application Switzerland, Jul. 8, 1986, 2748/86
Int. Cl.[4] F23L *1/00*
U.S. Cl. 431—115 **13 Claims**



1. A combustion chamber apparatus, comprising:

a. precombustion chamber for substoichiometric combustion, said precombustion chamber having a housing in which a fuel mixture is burned incomplete, said housing having a first and a second end;

said housing of the precombustion chamber including a body formed by the rotation of a symmetrical generatrix about an axis of symmetry of the generatrix, said housing including a curved interior region for guiding a flow of gases into a substantially annular vortex that is substantially concentric with said axis of symmetry;

an outlet channel formed on said housing for permitting gases to flow out of said housing along said axis of symmetry;

combustion air conduit means located about an outer periphery of said outlet channel for feeding combustion air into said housing parallel to the curved interior region of the housing such that said combustion air forms a layer adjacent the curved interior region;

liquid fuel injection nozzle means directed into the housing and located adjacent to and radially inwardly of the combustion air conduit means for directing liquid fuel into the housing with a flow that is parallel to and in the same direction as the flow of the combustion air entering through said combustion air conduit means, said flow of liquid fuel being separated from the curved interior region of the housing by said combustion air;

annular supplemental air conduit means provided at the outlet channel for blowing supplemental air into the gases exiting from the housing through the outlet channel; and

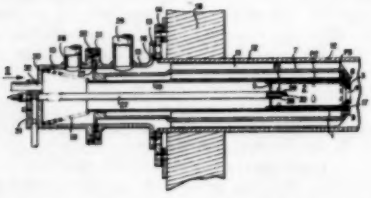
a postcombustion chamber located at the outlet channel thereby communicating with the interior of the housing, gases from the housing being completely burned with the supplemental air in the post combustion chamber.

4,894,006

BURNER SYSTEM IN PARTICULAR WITH A HIGH VELOCITY OF THE BURNT GASES

Jean-Pierre Cassagne, Fontenay Sous Bois, and Laurent Scrive, Paris, both of France, assignors to Gaz De France, Paris, France

Filed Jun. 10, 1988, Ser. No. 204,757
Claims priority, application France, Jun. 11, 1987, 87 08147
Int. Cl.[4] F23L *15/00*
U.S. Cl. 431—116 **21 Claims**



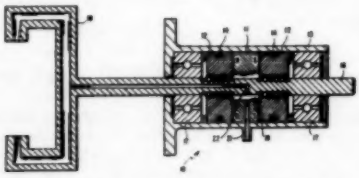
1. A burner system in particular with a high outlet velocity of the burnt gases, comprising: a central hearth tube defining a combustion chamber in which is admitted a mixture of combustible gas and of combustion-supporting gas such as air; a tubular element coaxially surrounding said hearth tube so as to form an annular space thereabout to allow flow of combustion-supporting air to be admitted into the hearth tube; the hearth tube having an outlet end and the outlet end being formed with a reduced portion made from thermomechanical ceramic for increasing the outlet speed of the gases; the tubular element having an outlet end having a radial restriction which forms an axial and radial positioning stop for the hearth tube, the hearth tube being axially biased into assembly with the other component parts of the burner by an assembly means for producing an axial pressure force under the impact of which the hearth tube bears against said stop through a radial shoulder provided in the reduced portion of the hearth tube, the system further comprising a tube made from a metal alloy, the tube having a portion adjacent to said hearth tube with substantially the same diameter as said hearth tube and the tube being axially aligned with the hearth tube inside of said tubular element and a duct extending in the tube, the duct feeding gas to said combustion chamber; and a burner shell, said assembling means producing an axial assembling force between said tube and a stationary portion of the burner shell, the assembling means comprising first and second annular magnets, each of the magnets having ends of opposite polarity, the first magnet being arranged on said tube and the second magnet being mounted on the shell of the burner in confronting relation to said first magnet in the axial direction of the burner so that the ends with the same magnetic polarity of the magnets are in an axially confronting relationship to produce an axial repelling force.

4,894,007

APPARATUS FOR PROVIDING FLUID TO A ROTATABLE MEMBER

Stephen T. Opresko, Lancaster, Pa., assignor to Thomson Consumer Electronics, Princeton, N.J.

Filed Dec. 12, 1988, Ser. No. 283,442
Int. Cl.[4] F23D *11/04*
U.S. Cl. 431—168 **2 Claims**



1. In a seal assembly for providing gas to a rotatable member, said seal assembly having a seal including a torroidal magnet arranged between annular ferromagnetic end closures, the bores of said enclosures rotatably receiving a shaft having a series of grooves, and a ferrofluid between said end closures and said shaft whereby said end closure, said ferrofluid, said shaft and said magnet form a magnetic flux path to attract said ferrofluid into the spaces between said shaft and said end closures to form an effective seal about said shaft, an improvement comprising a chamber between the bore of said magnet and said shaft, fluid inlet means for providing fluid to said chamber, said shaft being hollow from said chamber to one end and having means communicating with said chamber for providing fluid to said one end, said rotatable member being affixed to said one end for receiving fluid from said chamber.

2. The improvement of claim 1 wherein said fluid is a flammable gas and said rotatable member is a gas burner.

4,894,008

CANDLE HOLDING DEVICE

Sun Lee, 13812 W. 59th Ave., Arvada, Colo. 80004

Filed Apr. 4, 1989, Ser. No. 333,436
Int. Cl.[4] F23D *3/16*
U.S. Cl. 431—290 **22 Claims**

1. A device for holding a candle using fluid, comprising:

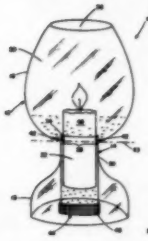
a first container defining a first hollow cavity, said first container having first and second openings;

at least one second container being adapted to receive and guide the candle and for holding fluid, said second container defining a second hollow cavity and having a third opening, an outer edge of said second container being fixedly mounted to said first container adjacent to said second opening, wherein said second container is immovable relative to said first container and a section of said second container protrudes into said first hollow cavity of said first container;

wherein said second container includes means for communicating a portion of the fluid held in said first hollow cavity into said second hollow cavity, and wherein the fluid moves directly from the first hollow cavity into said sec-

ond hollow cavity and the candle is supported by the fluid communicated into said second hollow cavity;

means for supporting connected to one of said first container and said second container; and



wherein said means for supporting includes a base having a hollow section and a bottom section of said second container is readily accessed via said hollow section.

4,894,009

APPARATUS FOR CONTACTLESS SEALING OF AN OPENING AGAINST EMERGING OR ENTERING GAS

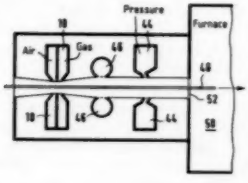
Carl Kramer, Am Chorusberg 8, and Hans J. Gerhardt, Lousbergstrasse 58, both of, 5100 Aachen, Fed. Rep. of Germany

Filed Dec. 22, 1988, Ser. No. 288,228

Claims priority, application Fed. Rep. of Germany, Dec. 22, 1987, 3743598

Int. Cl.[4] F27B *7/00*

U.S. Cl. 432—64 **12 Claims**



1. An apparatus for contactless sealing of an opening against emerging or entering gas by means of at least one barrier gas jet, wherein the or each barrier gas jet is divided by a separating plane extending in the vicinity of its longitudinal axis along a separating plane and wherein different gases flow out in the two sub-jets adjoining the separating plane, and wherein the momentum-flow density for the two sub-jets of the or each barrier gas jet in the exit cross-section is identical.

4,894,010

APPARATUS PREVENTING THE RETURN OF ATOMIZED SPRAY INTO DENTAL SURGERY INSTRUMENTS HAVING SEPARATE AIR AND WATER LINES

Franco Castellini, Bologna, Italy, assignor to Castellini S.p.A., Bologna, Italy

Filed May 13, 1988, Ser. No. 193,883

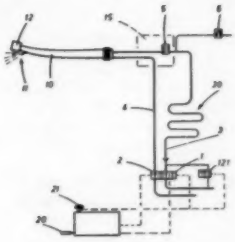
Claims priority, application Italy, May 29, 1987, 3497 A/87

Int. Cl.[4] A61C *1/00, 3/00*

U.S. Cl. 433—27 **8 Claims**

1. Apparatus to prevent the return of atomized spray into power driven dental surgery handpieces connected to separate air and water supply lines, comprising: shut-off air and water valve means connected to the air and water lines respectively and located between the air and the water lines and said dental handpiece;

a dentist controller pedal connected to said air and water valves means to simultaneously open and close said air and water valve means;



a compressed air reservoir connected in series with the air line at a point downstream of said air valve means, since compressed air reservoir having a capacity which is such that air will continue to flow from the handpieces for a short duration after closing said shut-off air and water valve means.

4,894,011

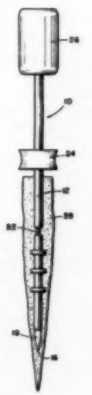
APPLIANCE FOR USE IN APPLYING FILLER MATERIAL TO AN ENDODONTICALLY PREPARED ROOT CANAL

William B. Johnson, 4254 E. 78th St., Tulsa, Okla. 74136

Filed Nov. 2, 1988, Ser. No. 265,942

Int. Cl.[4] A61C *5/02*

U.S. Cl. 433—81 **16 Claims**



1. An appliance for applying a filler material such as gutta-percha or the like to an endodontically prepared root canal of a tooth, comprising:

an elongated shaft having a distal portion and a proximal portion and of length such that the distal portion is positionable in at least substantially the full length of the root canal, at least the shaft distal portion being of material having high biological tolerance, and the distal portion having a spiral groove formed on the exterior surface thereof;

filler material formed onto said distal portion, the spiral groove serving to improve retention of the filler material

and for augering the filler material into a root canal when the appliance is rotated after insertion into a root canal, said distal portion of said shaft being severable from said proximal portion, the distal portion remaining in the root canal and, in conjunction with said filler material, serving to fill the canal; and

a manually manipulatable handle portion at said shaft proximal portion.

4,894,012

PASSIVE DENTAL APPLIANCES OF FIBER-REINFORCED COMPOSITES

A. Jon Goldberg, West Hartford, and Charles J. Burstone, Farmington, both of Conn., assignors to The University of Connecticut, Farmington, Conn.

Filed Nov. 16, 1987, Ser. No. 121,178

The portion of the term of this patent subsequent to Jan. 5, 2005, has been disclaimed.

Int. Cl.[4] A61C *7/00*

U.S. Cl. 433—215 **14 Claims**

1. In a passive dental appliance system wherein said system is selected from the group consisting of orthodontic retainers, bridges, space maintainers, tooth replacement appliances and splints, the improvement wherein a structural component thereof is fabricated as a preformed shape of high stiffness, strength, and stability, which exhibits ease of processing for subsequent application to a patient from an effective fiber-reinforced composite material comprising a polymeric matrix and a reinforcing fiber component embedded within the matrix, the reinforcing fiber component comprising at least about 30% by weight of the composite material and being substantially fully wetted by the polymer matrix, the composite material being substantially free of voids and having a modulus of elasticity greater than 0.5×10^6 psi.

4,894,013

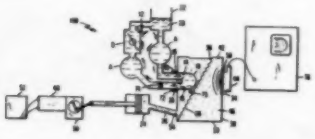
ANTHROPOMORPHIC CARDIAC ULTRASOUND PHANTOM

Stephen W. Smith, Rockville, and Jean E. Rinaldi, Silver Spring, both of Md., assignors to The United States of America as represented by the Department of Health and Human Services, Washington, D.C.

Filed Oct. 13, 1988, Ser. No. 257,174

Int. Cl.[4] G09B *23/28*

U.S. Cl. 434—268 **7 Claims**



1. An anthropomorphic cardiac ultrasound phantom for providing ultrasound imaging and Doppler signals of a simulated human blood flow, comprising

first means for simulating a flexible portion of a human heart, comprising valve means for controlling inflow to and outflow there-from;

pressurizing chamber means for substantially surrounding said first means, said chamber means having a drain and a hydraulic fluid flow port and also having a first ultrasound viewing means comprising a flexible membrane to enable ultrasound viewing therethrough, said means placed in a first chamber wall located at a selected distance from said first means;

reservoir means for holding a quantity of a blood analog fluid and communicating with said valve means to form a closed loop blood-analog fluid flow circuit with said first simulating means; and

hydraulic flow means for providing a controlled flow of a pressurized hydraulic fluid into and out of said chamber outside of said first means to pressurize said first means and drive a corresponding blood-analog fluid flow therethrough.

4,894,014

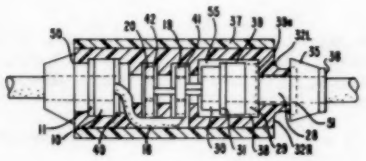
APPARATUS FOR PREVENTING THE TWISTING OF ELECTRICAL CABLES

Joseph Palus, 123 Gracey St., Edison, N.J. 08817, and Joseph A. Kapler, 197 Fresh Ponds Rd., South Brunswick, N.J. 08831

Filed Aug. 29, 1988, Ser. No. 237,449

Int. Cl.[4] H01R *35/00*

U.S. Cl. 439—17 **12 Claims**



1. An apparatus for preventing the undesirable twisting of an input electrical cable section having a one conductor wire, comprising:

a housing having an input port and an output port and having an internal hollow with a plurality of component carrying compartments,

with a one conductor wire directed via said input port into said housing,

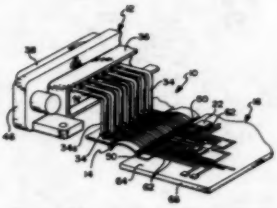
a conductive bearing assembly having an outer and an inner race which are operative to rotate with respect to one another about a common axis, with a central aperture associated with said inner race, said bearing assembly located in a compartment of said housing with said outer race restrained against rotation by said housing, with said one conductor wire electrically coupled to said outer race, a first clamping device module located in another compartment of said housing and operative to clamp said one conductor wire to prevent said one conductor wire from being pulled out of said input port, an output wire electrically coupled to said inner race, and directed through said output port, a second clamping device module located in a compartment of said housing and operative to clamp said output wire, an idler bearing assembly having an inner and an outer race, with said output wire directed through an aperture of said idler bearing assembly inner race prior to leaving said output port, and a bearing retainer surrounding said output wire, said bearing retainer extending from said idler bearing through said output port while having a portion contained in said housing with an opening adjacent said idler bearing assembly, whereby as said inner race of said conductive bearing assembly rotates with said idler bearing, said second clamping device module rotates with said output wire with said bearing retainer serving as a restraining guide to enable said output wire and clamping device to follow rapid rotation of said inner race of said conductive bearing assembly.

4,894,015

FLEXIBLE CIRCUIT INTERCONNECTOR AND METHOD OF ASSEMBLY THEREOF

David M. Stockero; Bruce A. Myers, and Robert H. Obremski, all of Kokomo, Ind., assignors to Delco Electronics Corporation, Kokomo, Ind.

Filed Aug. 31, 1988, Ser. No. 238,943
Int. Cl.[4] H01R 9/09
U.S. Cl. 439—67 10 Claims



1. An interconnect assembly for electrically connecting a connector housing having pin connectors with tail ends thereon and a circuit board having a printed conductor pattern thereon and wherein the pin connectors and printed conductor patterns are interconnectible along one side of the circuit board at a fine pitch spacing therebetween the interconnect assembly comprising:

a thin flexible sheet of dielectric polymeric material having a mating end and a connector end;

means defining a plurality of holes directed through said thin sheet of flexible dielectric polymeric material along the mating edge thereof arranged at spacings corresponding to the fine pitch spacing of pin connectors on a connector housing and each of the plurality of holes adapted to receive the tail end of one of the plurality of pin connectors on the connector housing;

means defining a plurality of electrically conductive runners on one side of said flexible sheet, each of said electrically conductive runners having a thickness which permits bending thereof as said thin sheet is bent and each of said runners having a first end located at one of said plurality of holes and the other end thereof extending adjacent the connector end of said thin flexible sheet;

means for electrically connecting each of said tail ends to one of said electrically conductive runners at one end thereof and wherein the opposite end of each of said electrically conductive runners is adapted to overlie an end of a printed conductor path printed on a circuit board for electrical connection thereto;

said thin flexible sheet having a bent portion between said mating end and said connector end when said thin flexible sheet interconnected to said tail ends and the circuit board; said bent portion having a self holding shape which accommodates differential thermal expansion between the interconnected connector housing and circuit board; and

said thin flexible sheet having a thickness in the order of 2 mils and including means on the mating end thereof to strengthen the sheet at the points thereon having said holes formed therethrough.

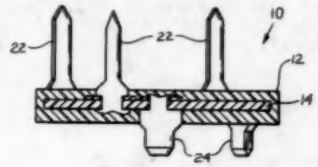
4,894,016

ELECTRICAL CONNECTOR

John O. Wright, Warren, Pa., assignor to GTE Products Corporation, Stamford, Conn.

Filed Jun. 27, 1988, Ser. No. 211,945
Int. Cl.[4] H01R 9/09
U.S. Cl. 439—76 2 Claims

1. An electrical connector comprising: an electrically insulating housing; a printed-circuit board within said housing, said printed circuit board having first and second sets of aperatures therein interconnected in a desired pattern; a first collection of electrical contacts fixed in said first set of apertures and extending outwardly therefrom, through said housing in a given direction; a second collection of electrical contacts fixed in said



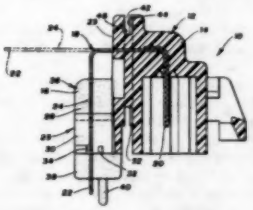
second set of apertures and extending outwardly therefrom, through said housing and in a direction opposite to said given direction; the number of contacts in said second collection being less than the number of contacts in said first collection.

4,894,017

ELECTRICAL HEADER ASSEMBLY

William L. Stein; Randy L. Fink, both of Warren, and Bruce J. Serbin, Austintown, all of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Jan. 13, 1989, Ser. No. 296,568
Int. Cl.[4] H01R 9/09
U.S. Cl. 439—78 10 Claims



1. An electrical header assembly for a printed circuit board or the like comprising:

a housing of thermoplastic material having a mating portion and a conductor portion,

a row of laterally spaced blade terminals of stamped sheet metal construction disposed in said mating portion and said conductor portion,

said blade terminals having tails which project longitudinally from an end of the conductor portion of the housing and which are bent vertically at a location spaced from the end of the conductor portion to provide vertical legs, and

means to position the vertical legs of the blade terminals for attachment to conductors of a printed circuit board or the like, said means including:

a plurality of vertical partitions at the said end of the conductor portion of the housing which form a plurality of vertical channels which receive vertical legs of the respective terminals,

said partitions having lower portions which form laterally deflectable lock walls on each side of each of the vertical channels,

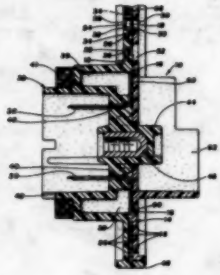
said laterally deflectable lock walls having stop nibs which limit the movement of the vertical legs toward the said end of the conductor portion and latch ramps which retain the vertical legs in the longitudinal direction away from the said end of the conductor portion.

4,894,018

LOW PROFILE ELECTRICAL CONNECTOR

Kevin P. Phillips, Chagrin Falls, and William R. Stein, Sr., Warren, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 8, 1988, Ser. No. 229,872
Int. Cl.[4] H01R 9/09
U.S. Cl. 439—81 **10 Claims**



1. An electrical connector comprising:

a circuit board of relatively rigid thermoplastic material, a support plate of thermoplastic material and a plurality of metallic bus strips disposed in channels of the circuit board which are covered by the support plate,

each of the bus strips having a female terminal portion disposed in a terminal cavity of its associated channel and a male terminal portion,

the circuit board having a rectangular opening and a pair of side slots communicating with each of the terminal cavities,

the support plate having an array of pin holes communicating with the respective terminal cavities and rectangular openings of the circuit board,

the female terminal portions including cantilevered contact fingers which are disposed over the rectangular openings of the circuit board so that the contact fingers deflect into the rectangular opening whereby pin terminals are easily inserted into the female terminal portions of the bus strips,

the cantilevered contact fingers having angularly disposed ends which are aligned with the pin holes of the support plate and extend into the rectangular openings of the circuit board to engage pin terminals inserted into the pin holes of the support plate, and

the female terminal portions having side flanges which are disposed in the side slots to resist bowing of the female terminal portions and assist in locating the female terminal portions with respect to the circuit board.

4,894,019

TORSION SPRING SHORTING CONNECTOR

William A. Howard, Barton, Ohio, assignor to Delta Systems, Inc., Streetsboro, Ohio

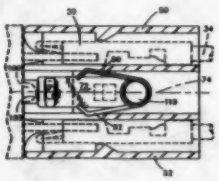
Continuation of Ser. No. 208,142, Jun. 16, 1988, abandoned. This application Jun. 20, 1989, Ser. No. 372,212
Int. Cl.[4] H01R 13/703
U.S. Cl. 439—188 **7 Claims**

1. Apparatus comprising:

(a) a housing having spaced side walls that define a housing interior for enclosing metal contacts in spaced apart relation and further defining a passageway leading to the housing interior to accommodate passage of signal carrying conductors coupled to the spaced apart metal contacts, said housing defining interior ribs that separate said two metal contacts and define a slot in said housing interior;

(b) an actuator movably supported in said slot for engagement with a mating connector that holds the actuator in a recessed position in the housing when the mating connector is brought into engaging relationship to the housing, said actuator having a post thereon; and

(c) a torsion spring shorting wire carried by the actuator and including a central loop embracingly engaging the post mounted on the actuator and having elongated contact portions, said elongated contact portions normally engaging the two metal contacts to short said contacts and being movable out of engagement with said contacts by said interior ribs when the actuator moves said shorting wire into the slot in response to contact by the mating connector said shorting wire biasing the actuator to move the elongated contact portions back into engagement with the two metal contacts if the mating connector becomes disengaged from the housing.

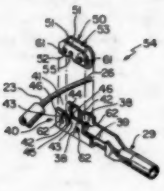


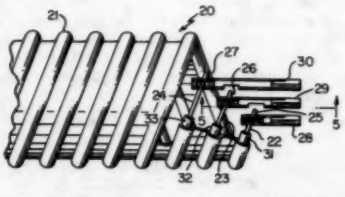
4,894,020

VACUUM CLEANER HOSE CONSTRUCTION AND METHOD OF MAKING THE SAME

Homer N. Holden, Sylva; Philip K. Loyer, Waynesville, both of N.C.; Lowell T. Noyes, Redding, Conn., and Janos J. Legrady, Putnam Valley, N.Y., assignors to Dayco Products, Inc., Dayton, Ohio

Filed Aug. 26, 1988, Ser. No. 237,344
Int. Cl.[4] H01R 4/60
U.S. Cl. 439—191 **18 Claims**





1. In a vacuum cleaner hose construction that comprises an elongated vacuum hose having an electrical conductor extending therealong and being provided with an end portion, and an electrical connector carried by said hose and being fixed to said end portion, said connector having a pair of spaced apart knife-like portions each being provided with opposed edges defining sides of a slot therein that has an open end and a closed

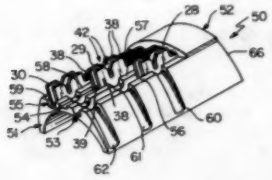
end, said knife-like portions of said connector having said open ends of said slots thereof facing in the same direction and being interconnected together at one end thereof to an intermediate part of said connector whereby said portions and said part define a U-shaped configuration that has a bight facing in the same direction as said open ends of said slots, said end portion being disposed in said slots of said connector and being wedged between said opposed edges thereof for providing electrical connection therebetween, said connector having holding means carried thereby and disposed adjacent said conductor to hold said conductor in said slots by trapping said conductor between said holding means and said closed ends of said slots, said holding means comprising a U-shaped holding member having a pair of spaced apart legs and a cross member interconnecting said legs together, said legs being respectively disposed adjacent said knife-like portions and between the same, the improvement wherein the bight of said U-shaped holding member faces in the same direction as said bight of said connector and wherein each leg of said holding member has a pair of spaced apart snap-fitting means snap-fitting with its respective knife-like portion of said connector to hold said holding member to said connector, each pair of said snap-fitting means being disposed on a line that generally passes through said conductor, said legs of said holding means comprising a pair of knife-like portions disposed in spaced apart parallel relation and being interconnected together by said cross member, each knife-like portion of said holding means having opposed edges defining sides of a slot therein that has an open end and a closed end, said knife-like portions of said holding means having said open ends of said slots thereof facing in a like direction that is opposite to the direction that said slots of said connector face.

4,894,021

VACUUM CLEANER HOSE CONSTRUCTION, INSERT THEREFOR AND METHODS OF MAKING THE SAME

Homer N. Holden, Sylva; Roger D. Meadows, and Philip K. Loyer, both of Waynesville, all of N.C., assignors to Dayco Products, Inc., Dayton, Ohio

Filed Aug. 22, 1988, Ser. No. 234,783
Int. Cl.[4] H01R *4/60*
U.S. Cl. 439—191 **12 Claims**



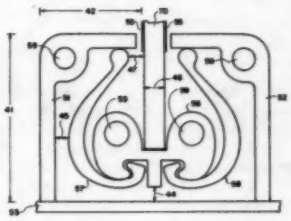
1. In a vacuum cleaner hose construction that comprises an elongated vacuum hose having an end and an electrical conductor extending helically therealong and being provided with an end portion at said end, an electrical terminal connector carried by said hose and being fixed to said end portion, an enlarged cuff disposed onto said end of said hose and covering at least part of said connector to hold said connector and its interconnected end portion in a predetermined position on said hose, and an insert for initially holding said connector and its interconnected end portion in said position before said cuff is disposed thereon, said insert also being at least partially covered by said cuff, the improvement wherein said insert has opposed ends one of which has a substantially straight slot means therein and an angular groove means therein leading to said slot means and intersecting the same at an angle relative thereto, the other of said opposed ends of said insert having opening means therein, said connector having opposed ends respectively disposed in said slot means and said opening means to be held thereby, said end portion of said conductor being disposed in said angular groove means.

4,894,022

SOLDERLESS SURFACE MOUNT CARD EDGE CONNECTOR

Peter U. Guckenheimer, Campbell, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jul. 28, 1988, Ser. No. 225,679
Int. Cl.[4] H01R *13/193, 23/70*
U.S. Cl. 439—260 **15 Claims**



1. A connector for providing electro-mechanical connection between a first printed circuit board and a second printed circuit board, the connector comprising:

a spring connector portion including,

a plurality of contacts, electrically insulated from one another, the contacts being adjacent to electrically conducting regions of the first printed circuit board, and

support means (56,163,131,132), mechanically coupled to the first printed circuit board, for holding the contacts in a predetermined unsprung position;

a plurality of fingers laid on a first portion of the second printed circuit board, the first portion of the second printed circuit board being inserted into the spring connector portion; and

attachment means, coupled to the first printed circuit board and the second printed circuit board, for attaching the first printed circuit board to the second printed circuit board in a fully engaged position;

wherein the plurality of contacts, the support means and the plurality of fingers are arranged so that when the attachment means places the first printed circuit board and the second printed circuit board in the fully engaged position the first portion of the second printed circuit board places pressure on the plurality of contacts so that each contact from the plurality of contacts is pressed downward onto an electrically conducting region from the electrically conducting regions of the first printed circuit board at a pivot point on the contact, the contact pivoting around the pivot point thereby converting the downward pressure into horizontal pressure horizontally pressing the contacts to the plurality of fingers and thus establishing electrical contact between the contacts and the electrically conducting regions and between the contacts and the fingers.

4,894,023

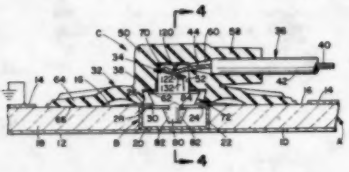
CONNECTOR ASSEMBLY FOR ANODE RING OF CATHODE RAY TUBE

Harold E. Hall, 14767 Madison Rd., Middlefield, Ohio 44062

Filed Sep. 6, 1988, Ser. No. 240,683
Int. Cl.[4] H01R *13/52*
U.S. Cl. 439—278 **67 Claims**

1. An anode connector assembly for electrically connecting a bared wire end of an insulated anode supply conductor to a standard anode button disposed in the glass envelope wall of a

cathode ray tube, said assembly comprising a resilient cap having a center axis and a head portion with a flexible, axially extending, circular skirt portion protruding laterally outwardly therefrom, a U-shaped sheet metal connector clip firmly supported interiorly of said cap within the said head portion thereof and having spaced mounting legs extending



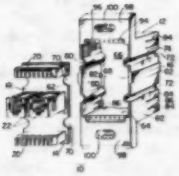
from said head portion into and exposed within the spatial confines of said skirt portion for engaging the said anode button, and an anode supply conductor having a bared wire end extending into the said head portion of said cap, said clip being directly pinch clamped in situ to said bared wire end interiorly of said cap by a pinch pad portion of said clip to electrically connect it to said bared wire end.

4,894,024

TELECOMMUNICATIONS WALL OUTLETS

George Debortoli, Ottawa, and Brian T. Osborne, Kanata, both of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Nov. 25, 1988, Ser. No. 275,885
Int. Cl.[4] H01R *13/74*
U.S. Cl. 439—535 **8 Claims**



1. A telecommunications wall outlet comprising a housing for a circuit assembly, and a circuit assembly for mounting within a chamber in the housing:

the housing comprising:

a base and a plurality of walls extending from the base to define the chamber of the housing, and an opening to the chamber remote from the base; and

at least one region of a said wall of the housing providing guide means projecting inwardly into the chamber and extending in a direction from the opening towards the base, for guiding the circuit assembly into a desired operational position within the chamber; and

said region of the wall also defining a cable guide formed in an outer surface of the wall for receiving and guiding a cable therein along the wall from the base towards the opening to the chamber; and

the circuit assembly comprising

a circuit member which provides a support element rigidly carrying electrical pathways in intimate contact with the support element, a modular telecommunications jack and a connector;

the circuit member having two sides, the jack and the connector both being mounted upon the circuit member and both having electrical terminal members, said electrical pathways on the support element interconnecting terminal members of the jack with terminal members of the connector; and

the circuit member having an edge with a recessed part cooperable with the guide means of the housing for guiding the circuit assembly as it is moved through the opening into the desired operational position with one of the two sides of the circuit member facing the base of the housing.

4,894,025

PLUG

Yu Feng Cheng, No. 7, Fu Hsing St., Tu Cheng Ind. Dist., Taipei, Taiwan

Filed May 8, 1989, Ser. No. 348,384
Int. Cl.[4] H01R *17/04*
U.S. Cl. 439—578 **1 Claim**

1. A plug comprising:

a substantially rod-shaped prong (10) having a conical end part;

a cylindrical insulating member (20) including a lengthwise oriented central circular slot (21) for receiving said prong (10), a vertically oriented rectangular slot (22), a slit (23), two recesses (24) and (25) on lateral sides thereof respectively, and two fixing plates (26), (27) lengthwise protruded from an end face remote from said slot (21);

a clamping sleeve (30) including a notch (31), two cutouts (32), (33) besides said notch (31), two engaging bodies (34), (35) adjacent to said two cutouts (32) and (33) respectively, said two engaging bodies (34) and (35) being engageable in the two recesses (24) and (25) respectively, said clamping sleeve (30) further including an extension piece which is formed with a circular hole (36) and a rectangular hole (37), and end of said extension piece being further extended to define two clamping plates 938), (39);

a cord (40) including a conducting wire (41) and a copper wire 942) therein, said conducting wire (41) being encased with an insulating layer (43); and

a plastic sleeve (50) enclosing said clamping sleeve (30);

whereby said conducting wire (41) is connectable to said prong (10) by using a lower electric pole (61) and an upper electric pole (62); said plug is adjusted such that said circular hole 936) of said clamping sleeve 930) is in alignment with said lower electric pole (61) so that said lower electric pole (61) is in contact with said prong (10), said upper electric pole (62), which is electrified, is pressable against said prong 910), through said notch (33) and said rectangular slot 922), so as to press said conducting wire 941) against said prong (10), whereby discharging between said upper electric pole 962) and said lower electric pole (61) causes said insulating layer (43) of said conducting wire (41) to melt such that a copper part inside said conducting wire (41) contacts with an upper side of said prong (10).

4,894,026

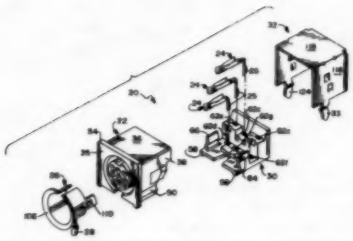
MINIATURE CIRCULAR DIN CONNECTOR

Daniel A. Dixon; Hsin Lee, both of Naperville; Eugene J. Mysiak, Lisle, and Henry Zielke, Hoffman Estates, all of Ill., assignors to Molex Incorporated, Lisle, Ill.

Continuation-in-part of Ser. No. 275,818, Nov. 25, 1988. This application Feb. 14, 1989, Ser. No. 310,979

Int. Cl.[4] H01R *13/648*

U.S. Cl. 439—609 19 Claims



1. A miniature DIN connector for mating with a DIN connector plug having a conductive shield extending thereabout, said miniature DIN connector comprising:

a nonconductive housing having opposed front and rear ends, a top and a bottom, a plurality of terminal-receiving apertures extending between the front and rear ends of said housing, said housing comprising channels generally adjacent the rear thereof and extending from each of said terminal-receiving apertures to the bottom of said housing for positively positioning and retaining portions of terminals extending from the apertures in the housing to a circuit board, said housing further comprising an internal shield aperture extending into the front end thereof and generally around said terminal-receiving apertures, said housing comprising an external shield aperture extending therethrough and into the internal shield aperture;

a plurality of electrically conductive terminals having pin-receiving contact portions engaged in the terminal-receiving apertures of said housing and board contact portions positively retained in the channels of said housing and extending beyond the bottom of said housing;

an internal shield mounted in the internal shield aperture extending into the front end of said housing, said internal shield comprising contact means extending therefrom for electrical connection to a ground and comprising a slot generally aligned with the external shield aperture;

a base having an array of apertures extending therethrough for receiving the board contact portions of said terminals, said base being mountable to the circuit board and comprising means for lockingly engaging the housing to the base; and

an external shield substantially defining at least three external sides of said miniature DIN connector and comprising a first contact means for grounding said external shield, said external shield comprising a second contact means extending through the external shield aperture of the housing and through the slot of the internal shield for directly contacting the shield of the DIN connector plug matable with the miniature DIN connector.

4,894,027

LAMP SOCKET TERMINAL

Duane L. Brantingham, Cortland, and Patrick J. Reedy, Youngstown, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Feb. 23, 1989, Ser. No. 313,916

Int. Cl.[4] H01R *33/06*

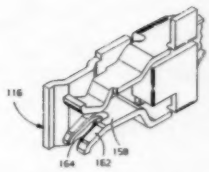
U.S. Cl. 439—699 10 Claims

1. A terminal for use in a lamp socket for a lamp bulb having a wedge base which includes a central vent tube bounded by laterally extending side wings, a pair of contact wires extending out of the respective ends of the side wings and bent over onto first sides of the respective side wings which are on opposite sides of the wedge base, and a pair of laterally extending troughs in second sides of the respective side wings which are on opposite sides of the wedge base, the terminal comprising:

a receptacle portion and an attachment portion for attaching the terminal to an electrical conductor;

the receptacle portion having a base wall and a pair of side walls forming a channel which is spaced rearwardly of a forward end of the base wall,

a spring contact arm which is integrally connected to a forward edge of one side wall of the channel in cantilever



fashion and projects forwardly to engage a contact wire extending out of an end of one side wing of the wedge base,

a spring detent arm which is integrally connected to the forward edge of the other side wall of the channel in cantilever fashion and projects forwardly to engage a trough in the one side wing of the wedge base, and

a stop tab which is connected to one of the side walls of the channel and which is disposed between the spring contact arm and the spring detent arm to engage the end of the one side wing when it is inserted into a space between the spring contact arm and the spring detent arm so as to properly locate the trough for engagement by the spring detent arm.

4,894,028

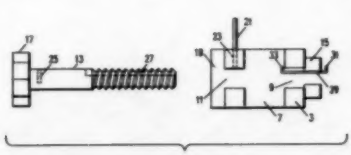
SELF-EXPANDABLE BATTERY TERMINAL CLAMP

James R. Deem, 1855 Belmont St., Boise, Id. 83706

Filed Apr. 12, 1988, Ser. No. 180,396

Int. Cl.[4] H01R *4/42*

U.S. Cl. 439—762 14 Claims



1. A self-expandable clamp comprising:

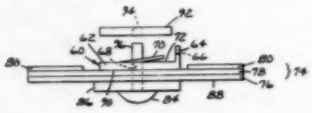
a generally C-shaped partial ring structure having first and second end portions defining an opening, said first and second end portions each having an elongated and flattened portion, said elongated and flattened portion extending radially outwardly from said C-shaped partial ring structure defining said opening;

a nut and bolt assembly, said flattened and elongated portion of said first of said first and second end portions each having a hole therethrough for receiving said bolt, said nut engaging said bolt when said bolt is inserted through said holes, said first and second end portions being urged together when said nut is tightened on said bolt thereby compressing said partial ring structure; and

means coupling said nut and bolt assembly to at least one of said first and second end portions, said means responsive

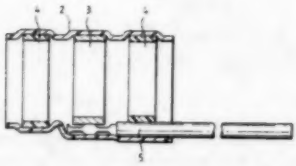
to said nut being untightened on said bolt to urge said first and second end portions apart thereby expanding said partial rin structure.

4,894,029
CONTACT FOR METALLIZED FILM
Richard A. Pope, Austin, Tex., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.
Filed Mar. 17, 1989, Ser. No. 325,154
Int. Cl.[4] H01R *13/00*
U.S. Cl. 439—816 20 Claims



1. An article for electrically connecting a metallized film to a conductor, comprising:
a contact member having upper and lower surfaces, said contact member being constructed of an electrically conductive material;
means for fastening said contact member to the metallized film; and
bias means for urging said lower surface of said contact member against the metallized film.

4,894,030
ELECTRICAL CONNECTOR
Patrick R. Chavaroux, Jouy-Le-Moutier, France, assignor to Raychem Pontoise S.A., France
Continuation of Ser. No. 240,990, Sep. 6, 1988, abandoned. This application Apr. 13, 1989, Ser. No. 338,486
Claims priority, application United Kingdom, Sep. 4, 1987, 8720876
Int. Cl.[4] H01R *4/02*
U.S. Cl. 439—874 4 Claims



1. An electrical connector for forming an electrical solder connection, which comprises an electrically insulating open-ended sleeve that is capable of receiving an electrical conductor, the sleeve having a pre-installed elongate electrical conductor that extends beyond the sleeve and a quantity of solder for forming an electrical connection between the conductors, wherein the pre-installed conductor has a region which will be contacted by the solder when the connection is formed and which has a cross-section that changes along its length so as to increase the force required to pull the two conductors apart in the completed solder connection.

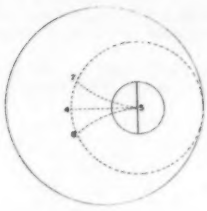
4,894,031
ELECTRONIC SOCKET CARRIER SYSTEM
Neil F. Damon, Fort Pierce, Fla., and Ronald E. Senor, North Attleboro, Mass., assignors to Augat Inc., Mansfield, Mass.
Continuation-in-part of Ser. No. 125,349, Nov. 25, 1987. This application May 19, 1988, Ser. No. 196,038
Int. Cl.[4] H01R *9/24*
U.S. Cl. 439—885 12 Claims

1. An electronic socket carrier system comprising:
a plurality of lead sockets each including:
a sleeve having an internal bore and an entrance opening at one end of said sleeve, said entrance opening of said internal bore defining a lead entry to said one end;
said sleeve including a head portion having a first diameter surrounding said one end;
a first portion contiguous with said head portion;
a plurality of circumferentially spaced barbs formed in said first portion by machining said first portion in an axial direction to remove material therefrom to provide outwardly extending barbs circumferentially spaced about said first portion, each barb having an upper edge tapering away from said head portion, and wherein said upper edges of said plurality of circumferentially spaced barbs define a circumferential band;
a plurality of machined channels formed in said first portion by machining said first portion in the axial direction to remove material therefrom, each of said plurality of channels being formed between adjacent ones of said plurality of circumferentially spaced barbs; and
a flexible carrier strip having a plurality of holes therethrough, each said hole sized to press-fit receive and releasably retain corresponding ones of said lead sockets, and wherein said circumferential band of upper edges of said barbs of each socket interface with one surface of the flexible carrier strip to retain said lead sockets in said carrier strip.

4,894,032
FLOATATION APPARATUS
Adolphe Sbrana, 11 Chemin de Font Sarrade, Martigues 13500, France
Continuation of Ser. No. 122,532, Nov. 9, 1987, abandoned, which is a continuation of Ser. No. 923,496, Oct. 27, 1986, abandoned. This application Jan. 9, 1989, Ser. No. 295,000
Claims priority, application France, Nov. 5, 1985, 85 16470
Int. Cl.[4] A63B *35/02*
U.S. Cl. 440—13 8 Claims

1. A flotation apparatus comprising:
(a) a buoyant body having an upper most planar surface with an essentially circular periphery for supporting a passenger and a lower surface including a flat bottom section and a sloping section extending upwardly at an oblique angle from said flat bottom towards said circular periphery; and
(b) means for controlling the position of the flotation apparatus when in water operably associated with said body, said means for controlling consisting essentially of:
(i) a flap having a length sufficient to extend substantially across said flat bottom section;
(ii) a rotatable shaft having a longitudinal axis eccentric with respect to a vertical axis extending through the center of said body with an end attached directly to an end of said

flap and another end provided with means for manipulating said shaft to alter the attitude of said flap 360° whereby said flap extends substantially across said flat bottom



section at some time during a 360° attitude alteration of said flap; and

(iii) a hollow channel for accommodating said shaft.

4,894,033

MULTIPURPOSE AND INFLATABLE RAFT

Herry Chang, No. 371-7, Hsin Ming Road, Nei Hu District, Taipei, Taiwan

Filed Feb. 19, 1988, Ser. No. 158,327

Int. Cl.[4] B63B *35/72*

U.S. Cl. 441—40 **12 Claims**

1. A multipurpose inflatable raft comprising:

an inflatable buoyant outer raft formed in a U-shape and defining a longitudinal axis, with each leg of said U-shaped portion being essentially parallel with said longitudinal axis, wherein said outer raft unit comprises a plurality of retainer plates attached in spaced relationship along the top, bottom and outer surfaces of said outer raft, and a plurality of retaining rings attached in spaced relationship along the outer surface of said outer raft;

an inflatable buoyant inner raft further comprising a plurality of retaining rings attached in a spaced relationship along the top periphery thereof and the bottom periphery thereof, wherein said inner raft may be positioned at spaced locations along said longitudinal axis whereby said retainer plates on said outer raft may be fastened to said retaining rings on said inner raft.

4,894,034

BODYBOARD WITH INTEGRALLY-CONTOURED HAND-HOLDS FOR ENHANCING CONTROL DURING RIDING

Russell S. Brown, III, Honolulu, Hi., assignor to Kransco, San Francisco, Calif.

Filed Oct. 2, 1987, Ser. No. 104,339

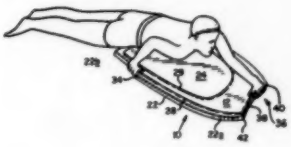
Int. Cl.[4] A63C *15/00*

U.S. Cl. 441—65 **7 Claims**

1. A bodyboard for supporting a rider during travel in ocean surf comprising:

an elongate, substantially planar board of substantially equal thickness having a top riding surface, a bottom planing surface, a forward section extending a major portion of the length of the board terminating in a front nose end for the board, a tail section extending a minor portion of the length of the board terminating in a rear end for the board, opposed fore side edge portions bounding opposite sides of said forward section and opposed aft side edge portions bounding opposed sides of said tail section, said fore side edge portions having rear ends adjacent the forward ends of said aft side edge portions and rear ends of the fore side edge portions being spaced laterally a greater distance than the forward ends of the aft side edge portions and the aft side edge portions extending nondivergently to the rear end of the board; and

hand-hold means disposed on each side of the board con-



toured for being securely gripped by a hand of the rider and for orienting and maintaining that hand in a predetermined position relative to the length of the board, wherein each hand hold means is defined by an offset edge section extending from the rear end of a fore side edge portion to the forward end of an aft side edge portion and oriented at an angle generally in the range of 90 to 160 degrees relative to the rear end of the fore side edge portion and dimensioned with an overall length sufficient for accommodating a rider's palm thereby to inhibit forward slippage of the rider's hand when the board is gripped at the offset edge section.

4,894,035

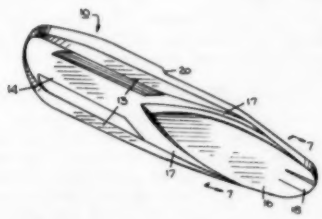
WATER CRAFT

Francesco A. Pia, 3 Boulder Brae La., Larchmont, N.Y. 10538

Continuation of Ser. No. 89,270, Aug. 25, 1987, abandoned. This application Oct. 27, 1988, Ser. No. 263,612

Int. Cl.[4] A63C *15/00*

U.S. Cl. 441—79 **21 Claims**



12. A water craft of board-like shape having a U-shaped bow section including a pair of longitudinally disposed runners on an underside and an unobstructed recessed central portion extending longitudinally between said runners; and

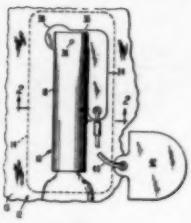
a parabolically shaped stern section including a centrally disposed longitudinally extending chine on an underside disposed in spaced relation to said runners to define a pair of channels therebetween, said chine extending across said stern section from side to side with each said channel communicating with said recessed central portion of said bow section and extending from said central portion laterally outwardly to a side of said stern section.

4,894,036

INFLATOR ASSEMBLY FOR LIFE VESTS

Stanley Switlik, Pennington, N.J., assignor to Switlik Parachute Company, Inc., Trenton, N.J.

Filed Aug. 8, 1988, Ser. No. 229,400
Int. Cl.[4] B63C 9/16
U.S. Cl. 441—93 15 Claims



1. For use in a life vest of the type having at least one cell inflatable by the expansion of gases escaping from a cartridge in which they have been confined in a compressed condition, an improved inflator assembly comprising:

(a) a housing mountable upon said cell and having a bore in which the cartridge is mountable and a gas exit port communicating the bore with the interior of the cell;

(b) a plunger sliding in the bore and adapted to pierce the cartridge to allow escape and expansion of the confined gases, the bore having communicating first and second spring chambers and the plunger being normally disposed therein in a standby position, the plunger having first and second seal means engaging, in the standby position of the plunger, the walls of the respective chambers at opposite sides of the port;

(c) first and second springs disposed in the first and second chambers respectively, the first spring being tensioned to bias the plunger from its standby position in a direction to pierce the cartridge and the second spring being tensioned to bias the plunger in an opposite direction to at least partially withdraw the same from the cartridge;

(d) a handle pivotally mounted in the housing for movement between standby and final operating positions respectively; and

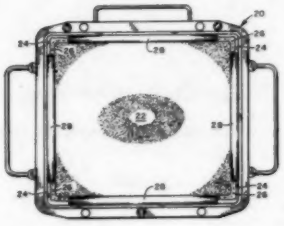
(e) a spring seat interposed between the cam surface and the first spring, said cam surface being adapted, when the handle is moved from its standby position, to shift the spring seat to place the springs under tension and effect direct contact of the spring seat with the plunger to bias the plunger to its cartridge-piercing position, the continued movement of the handle being adapted to lower the cam surface for bias of the plunger by the second spring in its opposite direction, to withdraw it from the pierced cartridge and thereby allow escaping gases to bias the plunger away from the cartridge a distance sufficient for both of said seal means to move fully to one side of the port, thus to permit exit of the gases through the port into the cell for inflating the same, the handle when fully thrown to its final operating position having its cam surface located to allow expansion of both springs to return the plunger to a position in which said seal means are again located at opposite sides of the port and will prevent leakage of said gases from the inflated cell through said bore.

4,894,037

FACTORY FIXTURE FRAME WITH MEANS FOR TEMPORARILY AND REMOVABLY SUPPORTING AN IN-PROCESS TENSION MASK FOR A COLOR CATHODE RAY TUBE

James R. Fendley, Arlington Hts., and John M. Jarosz, Skokie, both of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.

Filed Dec. 31, 1987, Ser. No. 139,892
Int. Cl.[4] H01J 9/227
U.S. Cl. 445—30 11 Claims



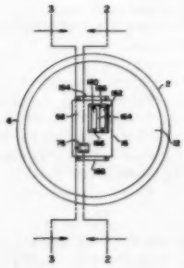
1. For use in the manufacture of a color cathode ray tube having a flat faceplate and a tensed foil shadow mask, a factory fixture frame for mounting an in-process shadow mask, the frame including peripheral groove means for receiving an edge of the shadow mask, and an elongate, generally cylindrical rod-like member which is split lengthwise thereof to provide compressibility and to press-fit into said groove means for temporarily and removably supporting an in-process shadow mask in tension.

4,894,038

FRISBEE DISK AND BALL DROP ASSEMBLY

Frederick F. Giese, 1012 Market St., P.O. Box 184, Monticello, Ill. 61856

Continuation of Ser. No. 133,103, Dec. 14, 1987. This application Mar. 27, 1989, Ser. No. 328,914
Int. Cl.[4] A63H 27/00
U.S. Cl. 446—46 11 Claims



1. An aerodynamic disk and carried member for flight through the air, in which said disk has an upwardly facing surface which faces generally upward and away from the earth during flight and a downwardly facing surface which faces generally downward and toward the earth during flight and a carried member carried by said disk during flight and separatable therefrom during flight, remote controlled separation means to separate said carried member from said disk on command during flight, and remote control transmitting means to command said separation means to separate said carried member from said disk during flight, wherein said remote con-

trolled separation means includes a discharge chamber to hold said carried member, said discharge chamber including a discharge aperture for discharge of said carried member from said discharge chamber on command from said remote control means, wherein said remote controlled separation means includes retention and discharge means movable between an aperture closed and aperture open position to respectively retain said carried member in said discharge chamber when in said aperture closed position and discharge said carried member from said discharge chamber when in said aperture open position, wherein said remote controlled separation means includes operating means to move said retention and discharge means between said aperture closed and aperture open positions, power means to drive said operating means, and a remote control receiver to start said power means and initiate operation of said operating means, said remote control transmitting means including a remote control transmitter operable to transmit a signal to said remote control receiver, wherein said retention and discharge means includes a gate member pivotally mounted for pivotable movement between said aperture open and aperture closed positions, biasing means to normally bias said gate member to said aperture closed position, said gate member including a projecting portion for engagement by a gate opening member, said operating means including said gate opening member, gear means to operate said gate opening member, said power means including a battery power supply to power an electric motor and an electric motor to drive said gear means, an operating and control circuit connected between said electric motor and said battery power supply to energize said motor upon receipt of a said signal by said remote control receiver from said remote control transmitter, said remote control receiver being connected in said operating and control circuit, including limit switch means to interrupt said operating and control circuit and stop said motor after a determined movement of said gear means, said gear means includes a planar gear having a planar surface, a first annular contact path extending around said planar surface of said planar gear, a second annular contact path extending around said planar surface of said planar gear spaced apart radially from said first annular contact path and concentric therewith, said first annular contact path being continuously electrically conductive throughout its entire circumference, said second annular contact path having a first arcuate portion which is electrically conductive and a second arcuate portion which is electrically non-conductive, a first electrical contact in continuous contact with said first annular contact path as said planar gear rotates, a second electrical contact in continuous contact with said second annular contact path as said planar gear rotates, said first and second electrical contacts being connected in a disconnect circuit, including said disconnect circuit, said disconnect circuit being completed and energized when said second electrical contact is in contact with said first electrical conductive arcuate portion of said second annular contact path and being interrupted and de-energized when said second contact is in contact with said second non-conductive arcuate portion of said second annular contact path, said limit switch means being in said disconnect circuit and connected to interrupt said operating and control circuit and stop said motor when said planar gear rotates said first conductive arcuate portion of said second annular contact path into contact with said second electrical contact.

4,894,039

LEVITATING TOY FLYING SAUCER PACKAGING AND STORAGE

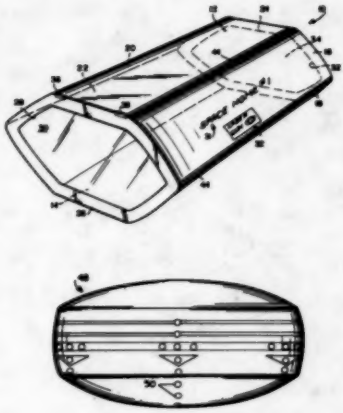
Zenn R. Taylor, 4333 Harbor House Dr., Tampa, Fla. 33615, and Lester D. Barton, 12833 N. 17th Ave., Phoenix, Ariz. 85029

Filed Sep. 1, 1988, Ser. No. 239,308
Int. Cl.[4] A63H *27/10*
U.S. Cl. 446—75 **9 Claims**

1. A combination balloon toy and storage container comprising:

(a) an inflatable balloon toy shaped to resemble a toy flying saucer-type vehicle;

(b) a container for storing said balloon toy in at least a partially inflated state, said container shaped and provided



with indicia to simulate the appearance of a toy space station, said container including at least one openable wall for permitting said balloon toy to be inserted and withdrawn from said container.

4,894,040

TOY BUILDING ELEMENT WITH ELEMENTS FOR PROVIDING POSITIONAL INFORMATION

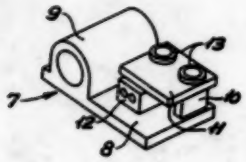
Erik Bach, Billund, and Allan Toft, Vejle, both of Denmark, assignors to Interlego AG., Switzerland

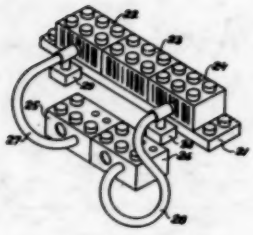
PCT No. PCT/DK87/00005, § 371 Date Sep. 22, 1987, § 102(e) Date Sep. 22, 1987, PCT Pub. No. WO87/04365, PCT Pub. Date Jul. 30, 1987
PCT Filed Jan. 21, 1987, Ser. No. 102,145
Claims priority, application Denmark, Jan. 22, 1986, 325/86
Int. Cl.[4] A63H *33/04, 30/00, 33/22, 33/26*
U.S. Cl. 446—91 **8 Claims**

1. A toy building set with elements featuring projections on one surface engageable with apertures on a surface of another element;

at least one element for providing positional information by detection of reflected energy, such as light, said one element including both an energy radiating source and an energy receiving detector and including at least one of said projections on one surface and said apertures on another surface which provide means for mechanically coupling said one element with other elements belonging to the building set, a power input means for driving said

energy radiating source and a signal output means as a conduit for a signal from said energy receiving detector; energy reflecting means; and,





means for operatively coupling said one element with said energy reflecting means.

4,894,041

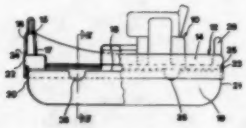
TOY BOAT

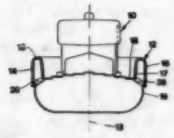
Lennart Dahlgren, Askim, Sweden, assignor to Aqua Toys AB, Askim, Sweden

Continuation of Ser. No. 844,501, Jul. 11, 1986, abandoned. This application Sep. 30, 1988, Ser. No. 251,997

Int. Cl.[4] A63H *23/02, 23/00*

U.S. Cl. 446—160 **2 Claims**





1. A toy boat comprising:

a hollow hull produced by blow moulding of a thermoplastic material in a mould, said hull comprising a deck having an outer perihery and an upper surface, an outer skin, a plurality of positional portions protruding from said outer skin and a bottom;

at least one ring forming a gunwale for said hull, said ring surrounding the outer periphery of said deck and an adjacent portion of said skin, said ring having a U-shaped cross section having a longer and a shorter shank, the latter having a lower end which rests on the upper surface of the deck of the hull, said ring further having a plurality of recesses cooperating with respective ones of said positional portions of said hull for detachably connecting said ring to said hull and positionally locating the ring relative to the hull.

4,894,042

FLIP-OVER TOY VEHICLE

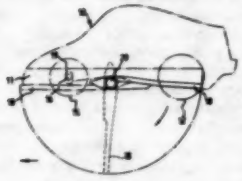
Hiromi Kamikawa, Tokyo, Japan, assignor to Maple Toys International Ltd., Hong Kong

Filed May 19, 1988, Ser. No. 196,018

Claims priority, application Japan, Nov. 19, 1987, 62-176699

Int. Cl.[4] A63H *17/00, 17/26*

U.S. Cl. 446—437 **6 Claims**



1. A flip-over toy vehicle, comprising a vehicle body, wheels supported for rotation relative to the body, at least one of the wheels being connected to a motor for driving said wheel and at least one other of said wheels being a non-driven wheel, a spring-loaded flip-over device connected to the body and movable relative to the body between a first and a second position to cause the toy vehicle to flip over, a rotatable latching device for releasably holding the spring-loaded flip-over device in its first position, and a release mechanism for releasing the latching device, said non-driven wheel being mounted for rotation with a worm, the release mechanism having a toothed gear engageable with the worm and an operating arm connected to the toothed gear, the latching device including a birfurcated arm having bifurcations for interacting with the operating arm of the release mechanism such that upon rotation of the non-driven wheel the operating arm of the release mechanism acts to unlatch the flip-over device.

4,894,043

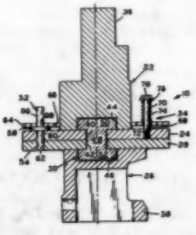
TORQUE TRANSMITTING COUPLER WITH SHEAR CAPABILITY AND COMPONENT SEPARATION CONTAINMENT

Robert E. Nixon, Jr., 3138 Riddle Rd., West Palm Beach, Fla. 33406

Filed Feb. 9, 1988, Ser. No. 153,980

Int. Cl.[4] F16D *9/00*

U.S. Cl. 464—33 **6 Claims**



1. A torque transmitting coupler for drivingly connecting a rotary drive mechanism and a rotary driven tool, said torque transmitting coupler comprising:

(a) a driving member having a driving plate rigidly attached on an inner portion thereof, said driving plate encompass-

ing and extending radially outward from said driving member;

(b) a driven member having a driven plate rigidly attached on an inner portion thereof, said driven plate encompassing and extending radially outward from said driven member;

(c) a swivel connecting means inter connecting said driving and said driven members together in a coupled relation at their respective inner portions such that said members are rotatable relative to one another and said respective driving and driven plates thereon are disposed in an adjacent relation to one another;

(d) at least one shearable element interconnecting said driving and said driven plate together so as to cause transmitting of torque from one of said members to the other via said respective plates, said element being designed to shear at a predetermined torque load imposed thereon by one of said members via its respective plate, said driving and driven plates having respective holes being alignable with each other for receiving a respective and portion of said shearable element;

(e) retaining means for capturing and maintaining said shearable element adjacent to one of said driving and driven plates both before and after said element has been sheared, said retaining means including a disk attached on said shearable element between its opposite end portions and an annular retainer plate having a hole for receiving one of said end portions of said shearable element;

(f) said retaining means further including a plurality of spring-loaded posts mounted on one of said driving and driven plates and movably mounting said retainer plate so as to receive the other of said end portions of said shearable element and overlie said disk on said pin, thereby capturing said other shearable element end portion and said disk between said retainer plate and said one of the driving and driven plate even after said one end portion of said pin has sheared;

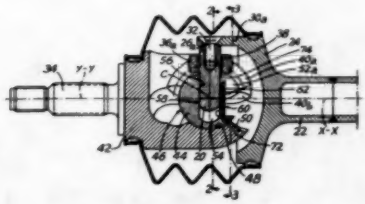
(g) said swivel connecting means interconnecting said driving and said driven members so as to maintain them together in said coupled relation even after shearing of said shearable element.

4,894,044

HOMOKINETIC JOINT COMPRISING AN AXIALLY RETAINED TRIPOD ELEMENT

Bernard Poulin, Conflans Ste Honorine, and Francois Verbrugge, Cergy, both of France, assignors to Glaenzer-Spicer, Poissy, France

Filed Sep. 26, 1988, Ser. No. 249,558
Claims priority, application France, Oct. 1, 1987, 87 13595
Int. Cl.[4] F16D 3/30
U.S. Cl. 464—111 **17 Claims**



1. A homokinetic joint for coupling two shafts, said joint comprising:

a tulip element connectable to a first shaft, said tulip element comprising a plurality of branches extending axially of said element and collectively defining a concave spherical recess therewithin, and said tulip element defining three rolling ways;

a tripod element connectable to a second shaft to be coupled to the first shaft, said tripod element comprising three trunnions and rollers rotatively mounted to said trunnions, said rollers disposed and rollable on said rolling ways; and

axial retaining means connected between said tripod element and said tulip element for positioning said tripod element relative said tulip element,

said axial retaining means including an intermediate element disposed in said concave spherical recess defined by the branches of said tulip element and in which intermediate element said tripod element is received, and a retaining element restraining said tripod element from moving axially relative to said intermediate element,

said intermediate element having an outer surface portion having the shape of a portion of a sphere so as to be complementary to said spherical recess and confronting said tulip element at said spherical recess, said intermediate element defining an equatorial cavity therein in which said tripod element is received and is movable relative to said intermediate element in directions lying in a plane extending perpendicular to the axial direction in which said tripod element is restrained from moving by said retaining element, and said intermediate element defining three notches therein open to said equatorial cavity for facilitating the insertion of said tripod element into said cavity,

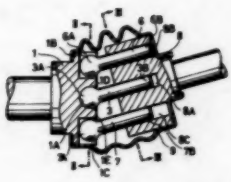
said notches having widths that are only slightly larger than the outer diameters of said trunnions, respectively, and said tripod element being substantially immovable relative to said intermediate element in said directions when disposed in said notches yet movable in said directions once said tripod element has been inserted into said cavity through said notches.

4,894,045

UNIVERSAL JOINT HAVING DRIVING PINS PARALLEL TO ONE OF COUPLED SHAFTS AND SWINGABLY AND RADIALLY SLIDABLE TO THE OTHER SHAFT

Hisanobu Kanamaru, and Kouji Harada, both of Katsuta, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 27, 1988, Ser. No. 200,066
Claims priority, application Japan, Jan. 5, 1987, 62-139781
Int. Cl.[4] F16D 3/48
U.S. Cl. 464—138 **11 Claims**



1. A universal joint comprising:

first and second rotating members each having a rotating axis and arranged end to end with a distance therebetween;

a guide pin having a spherical portion at one end thereof and rotatable and swingably held by one of said first and second members at the rotating axis, and the other end of said guide pin being slidably inserted in the other member along the rotating axis; and

at least a pair of driving pins arranged symmetrically with respect to said guide pin, and each having one end swingably and radially slidably held by said first member and the other end inserted in said second member, one end of each of said driving pins being axially slidable, and said driving pins each being parallel to the rotating axis of said second member so that an angle between each of said

driving pin and the rotating axis of said second member is fixed.

4,894,046

CONTROL UNIT FOR CHAIN SHIFTER

Bruce W. Browning, 98 Union St., Seattle, Wash. 98101

Filed May 13, 1988, Ser. No. 193,738

Int. Cl.[4] F16H *9/00*

U.S. Cl. 474—78 **10 Claims**

1. A control unit for a chain shifter comprising:
a reversible electric selector motor;
a pawl guide housing having a pawl guideway formed therethrough;
a cam selector pivotably connected in the pawl guideway;
a pair of pivoted latch arms;
a lobe positioned between the latch arms and driven by the motor;
spring means biasing portions of the latch arm apart;
a key positioned between the latch arms and held by the latch arms and the spring when the lobe is centered and turned by the latch arms when the lobe is turned off center by the motor; and
means transmitting rotary motion of the key to the cam selector.

4,894,047

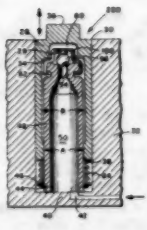
RETAINING CAGE FOR CHECK-VALVES AND SLACK ADJUSTERS USING SAME

Mark S. Breon, and Leslie L. Ecklund, both of Battle Creek, Mich., assignors to Eaton Corporation, Cleveland, Ohio

Filed Apr. 26, 1989, Ser. No. 343,232

Int. Cl.[4] F16H *7/08*

U.S. Cl. 474—110 **22 Claims**



1. A cage for holding a check-valve in registration with a passageway through an end wall of a substantially cylindrical member separating a pair of fluid chambers for controlling fluid flow therebetween, said cylindrical member having a groove in the outer surface thereof facing radially outwardly away from the passageway in proximity to the end wall, said cage configured in the form of a hollow end-cap having a base having an entrance-way thereinto surrounded by a flange extending radially inwardly theretowards and operative to extend into the groove and resiliently secure the cage thereto, said cage having a first cavity therewithin adjacent the entrance-way that is adapted to receive thereinto the cylindrical member between the end wall and the groove, said cage having a second cavity therewithin that communicates with the first cavity on the opposite side thereof from the entrance-way thereinto and is smaller than the first cavity and aligned substantially concentrically therewith and operative to receive the check-valve thereinto and hold the check-valve in registration with the passageway, said cage having at least one aperture adapted to enable the fluid to flow between the chambers therethrough, and said cage operable to enable the check-valve against the passageway to prevent the fluid from flowing from one chamber into the other chamber when the fluid pressure in the other chamber exceeds the fluid pressure in said one chamber by a prescribed amount and to enable the check-valve to release from the passageway sufficiently to enable the fluid to flow from one said chamber into the other chamber when the fluid pressure in said chamber exceeds the fluid pressure in the other chamber by a prescribed amount.

4,894,048

V BELT WITH BLOCKS

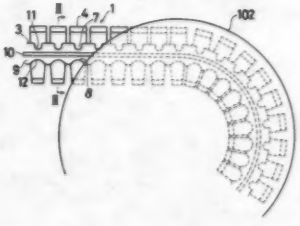
Masahiro Inukai, and Hiroshi Matsuoka, both of Kobe, Japan, assignors to Bando Chemical Industries, Ltd., Hyogo, Japan

Division of Ser. No. 90,064, Aug. 27, 1987, Pat. No. 4,813,920. This application Sep. 13, 1988, Ser. No. 243,747

Claims priority, application Japan, Aug. 28, 1986, 61-132455; Sep. 30, 1986, 61-150844

Int. Cl.[4] F16G *1/22*

U.S. Cl. 474—240 **6 Claims**



1. A V belt for high load transmitting comprising: a plurality of blocks; and endless load carriers, wherein said blocks are engaged with said endless load carriers having tensile members in a lengthwise direction along said belt, and wherein at least a part of a cross-section of a side surface of each block is substantially formed in an arcuate shape, wherein the center of gravity of said blocks is substantially close to said tensile members of said load carriers, and said blocks in substantially perpendicular state in relation to the load carriers in a straight running state.

4,894,049

TRANSMISSION BELT, CROSS ELEMENT FOR A TRANSMISSION BELT AND METHOD AND DEVICE FOR THE PRODUCTION THEREOF

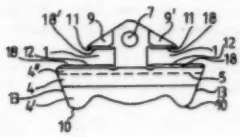
Willem Koppelaars, Oisterwijk, Netherlands, assignor to Van Doorne's Transmissie B.V., Tilburg, Netherlands

Filed Jan. 22, 1988, Ser. No. 146,872

Claims priority, application Netherlands, Jan. 23, 1987, 8700156

Int. Cl.[4] F16G 1/22

U.S. Cl. 474—240 **7 Claims**



1. Cross element for a transmission belt having an endless carrier in the form of at least one metal band and a plurality of said cross elements, said cross element comprising at least two main sides and at least one recess for receiving the carrier, a bevel extending radially inwardly with respect to the belt for enabling bending of the transmission belt, whereby said bevel passes into the main side by a tilting line, at least three calibrated, separated, mutually parallel surfaces provided on at least one of said main sides, said surface being at substantially the same level relative to each other, whereby adjacent cross elements abut against each other, respectively with said main side and with said at least three surfaces.

4,894,050

STERILE LABORATORY CENTRIFUGE

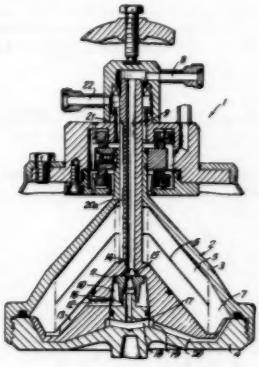
Werner Kohlstette, and Ulrich Rotermund, both of Oelde, Fed. Rep. of Germany, assignors to Westfalia Separtor AG, Oelde, Fed. Rep. of Germany

Filed Apr. 13, 1989, Ser. No. 337,499

Claims priority, application Fed. Rep. of Germany, May 21, 1988, 3817473

Int. Cl.[4] B04B 11/00

U.S. Cl. 494—30 **6 Claims**



1. In a centrifuge, having an intake channel for material being centrifuged, a runoff channel for a clear phase, and a drum with a centrifuging space comprising a separation space having a package of disks and a solids space, means for effecting an initial operation wherein material to be centrifuged is introduced into the separation space and solids are separated from the clear phase followed by another operation that wherein intake of material to be centrifuged is discontinued and rinse is introduced into the drum through the clear-phase runoff channel, the improvement wherein the means for effecting the initial and another operations comprises the intake channel for supplying material to be centrifuged during the initial operation having two sections, a valve chamber between the two channel sections, a channel for diverting solids and extending from a periphery of the solids space to the valve chamber, and a valve body slidably received in the valve chamber and movable between a first position during the initial operation wherein the two channel sections are in communication and the solids-diversion channel is closed and a second position to initiate the second operation wherein one channel section which leads from the valve chamber to the separation space, is separated from the other channel section and connect the solids-diversion channel is connected to the other channel section, to allow solids to be extracted through the other channel section.

4,894,051

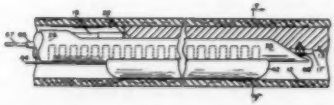
ATHERECTOMY SYSTEM WITH A BIASING SLEEVE AND METHOD OF USING THE SAME

Samuel Shiber, Mundelein, Ill., assignor to Surgical Systems & Instruments, Inc., Mundelein, Ill.

Continuation-in-part of Ser. No. 243,900, Sep. 13, 1988, which is a continuation-in-part of Ser. No. 78,042, Jul. 27, 1987, Pat. No. 4,818,634, and a continuation-in-part of Ser. No. 205,479, Jun. 13, 1988, and a continuation-in-part of Ser. No. 225,880, Jul. 29, 1988, Pat. No. 4,842,579, which is a continuation-in-part of Ser. No. 18,083, Feb. 24, 1987, which is a continuation-in-part of Ser. No. 874,546, Jun. 16, 1986, Pat. No. 4,732,154, which is a continuation-in-part of Ser. No. 609,846, May 14, 1984, abandoned. This application Dec. 19, 1988, Ser. No. 286,509

Int. Cl.[4] A61B 17/32

U.S. Cl. 604—22 **24 Claims**



1. An atherectomy system for coring, ingesting and removing an obstruction from within a patient's vessel, comprising in combination:

a flexible guide-wire insertable into the vessel,

a flexible rotary catheter, rotably disposed and insertable into the vessel over said flexible guide-wire, having at its distal end a rotary coring means for making a circular cut in an obstruction located in front of it, and coupling means at its proximal end,

a continuous passage, for ingesting the cored obstruction material, defined between said flexible rotary catheter and said flexible guide-wire, where the relative motion between said flexible rotary catheter and said flexible guide-wire assists in moving said ingested obstruction material proximally in said continuous passage, and,

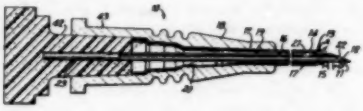
a sleeve in which said flexible catheter is slidably disposed, said sleeve having an elongated tongue extending from its distal end, said tongue defining inside said vessel an eccentrically biased trajectory for said coring means to move along.

4,894,052

FLASH DETECTION IN AN OVER THE NEEDLE CATHETER WITH A RESTRICTED NEEDLE BORE

Mark A. Crawford, Sandy, Utah, assignor to Becton, Dickinson and Company, Franklin Lakes, N.J.

Filed Aug. 22, 1988, Ser. No. 234,664
Int. Cl.[4] A61M 5/18
U.S. Cl. 604—63 **17 Claims**



1. A catheter introducer for carrying a coaxially placed over the needle catheter into a blood vessel comprising:

a needle assembly including an elongate hollow tube including a wall defined by an inside and an outside surface with a bore therethrough and a tip at one end of said tube and a hub at the other;

a tubular translucent catheter formed for coaxial placement over said needle tube and to be carried thereby during a penetration procedure for introducing said catheter into a blood vessel and said catheter being elongate with an end positioned just proximal to said needle tip and extending therefrom over and along said tube toward said hub;

a catheter adapter having a body connecting to said catheter at an end near said needle hub and fitted to said catheter in fluid tight relation, and said body including an internal chamber shaped to fit over at least a part of said hub coaxially aligning said catheter relative to said needle tube;

a cavity located between said outside surface of said tube, said catheter extending along said needle tube from said catheter tip end to said hub end;

a port passing through said needle tube from said bore to said cavity for permitting fluid communication from said needle bore near said needle tip to said cavity near said hub;

restriction means associated with said hub for substantially inhibiting flow through said bore within an area in said bore between said port and said hub; and

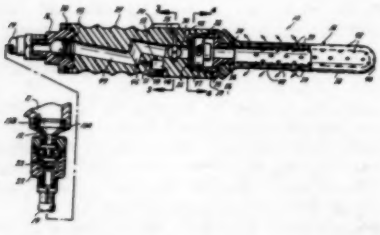
blood separation and venting means associated with said hub for cooperating with said catheter adapter chamber to allow liquid in said cavity to remain in a portion of said hub which contains liquid blood and vents gas.

4,894,053

DOUCHE APPARATUS

David C. Reddick, 3866 Fairview, St. Louis, Mo. 63116

Filed Aug. 26, 1988, Ser. No. 236,723
Int. Cl.[4] A61M 3/00
U.S. Cl. 604—85 **4 Claims**



1. A douche apparatus, comprising:

a. means for adapting said apparatus to a source of combined hot and cold water from individual supplies that permit adjustment of flow and mix for volume and temperature setting,

b. a nearly cylindrical handle having a first threaded female receptacle at one end, and second female threaded receptacle at its opposite end, and a hollow, liquid, axial flow channel between said female receptacles, said flow channel having a transverse transition at a location intermediate the opposing ends of said handle,

c. means connected between said adapting means and said first threaded female receptacle of said handle for communicating water from said source,

d. an additive chamber radially disposed between the outer surface of said handle and said flow channel at a point downstream from said transition, said chamber having a fluid input connection from said transverse transition and a fluid return connection to said axial flow channel after said transition, said additive chamber having a female threaded entry and a cap with corresponding male threads for positive closure,

e. a gate valve rotatably disposed in said axial flow channel between said fluid return and said second female receptacle said gate valve connected to a rotatable stem transversely exiting said handle to an attached valve handle rotatably operable upon the surface of said douche apparatus handle between two stops located thereon, said stops corresponding to the fully closed and open conditions of said gate valve in said flow channel,

f. a macro screen receptacle between the terminus of said flow channel and said second female receptacle,

g. a micro screen within said second female receptacle abutting said macro screen,

h. a handle end cap threaded into said second female receptacle,

i. a cylindrically-shaped tube having a hollow central portion and an open end with one side of a mating connector for connection to the exit of said nearly cylindrical handle, said cylindrically-shaped tube having a plurality of holes spiralling radially downward and around said tube toward its open end, from said hollow, central portion to its exterior, and a semi-spherically-shaped tip at its opposite end, said tip having a hollow central portion connecting with the hollow central portion of said cylindrically-shaped tube, and a plurality of holes directed radially downward and around said tip towards said holding means, from said hollow, central portion of said tip to its exterior,

j. a thermostaticaly controlled valve connected between said adapting means and said communicating means, and

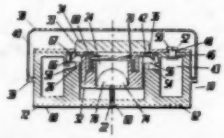
k. a back-flow prevention valve connected between said adaptive means and said nearly cylindrical handle.

4,894,054

PRELOADED AUTOMATIC DISPOSABLE SYRINGE

Shir A. Miskinyar, 13342 Clinton St., Garden Grove, Calif. 92643

Filed Jun. 20, 1988, Ser. No. 208,486
Int. Cl.[4] A61M 5/20
U.S. Cl. 604—136 **22 Claims**



1. A disposable, subcutaneous injection syringe which comprises:

a. a cylindrical housing having an outer diameter greater than its length and having a central, cylindrical well, a

first aperture in its bottom wall and a second aperture in its top wall;

b. a cylinder having an outer diameter to be received in said cylindrical well of said housing and received therein for sliding movement between said apertures, a through bore in the bottom wall of said cylinder and a hypodermic needle permanently mounted therein, and a piston slidably received in said cylinder;

c. a dispenser carriage mounted in said housing and moveable therein through an axial distance less than said outer diameter of said cylinder, between retracted and extended positions;

d. a trigger button carried on said carriage and projecting through said second aperture;

e. means coupling said piston to said carriage;

f. cylinder retraction means within said housing to maintain said needle withdrawn in said housing;

g. a single actuator spring received within said housing and bearing against said cylinder to extend said needle through said first aperture in the bottom wall of said housing;

h. a single detent, which engages said carriage in its retracted position and restrains its movement in said housing; and

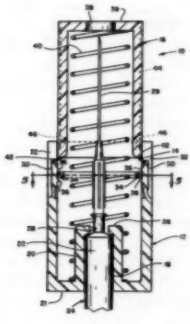
i. a sterile seal cover extending across said first aperture.

4,894,055

NEEDLE GUARD ASSEMBLY FOR USE WITH HYPODERMIC SYRINGES AND THE LIKE

Paul J. Sudnak, 1210 Cote Sans Dessein, Fulton, Mo. 65251

Filed Dec. 28, 1988, Ser. No. 291,062
Int. Cl.[4] A61M 5/00
U.S. Cl. 604—198 **27 Claims**



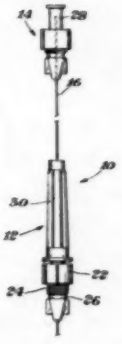
1. A needle guard assembly for use in conjunction with a syringe device having a needle projecting from one end portion thereof comprising a first tubular member having spaced opposed end portions and an inner and outer surface, said first tubular member having means associated with one end portion thereof for cooperatively receiving the needle end portion of a syringe device with the needle extending therethrough, a second tubular member telescopingly positioned within said first tubular member and extending endwardly from the free end portion of said first tubular member, said second tubular member being movable between an extended position and a position wherein said member is at least partially retracted within said first tubular member, means biasing said second tubular member to its extended position, bendable tab means associated with said first tubular member adjacent the free end portion thereof including means biasing said tab means outwardly so that the inner surface thereof is substantially coplanar with the inner surface of said first tubular member, movement of said second tubular member into said first member moving the means biasing said tab means out of engagement with said tab means enabling said tab means to move inwardly behind the one end portion of said second tubular member when said biasing means moves said second tubular member to its extended position thereby preventing said second tubular member from again moving into said first tubular member.

4,894,056

METHOD AND APPARATUS FOR CLEARING OCCLUDED LUMENS OF ENTERAL FEEDING TUBES

Alexander A. Bommarito, 12555 W. Freeland Rd., Freeland, Mich. 48623

Continuation-in-part of Ser. No. 56,453, Jun. 1, 1987, abandoned. This application Mar. 3, 1988, Ser. No. 163,749
Int. Cl.[4] A61M 5/00
U.S. Cl. 604—267 **1 Claim**



1. A method for removing occlusions from tubes employed for enteral feeding which comprises inserting an inner polycarbonate tube having a first end and a second end into said occluded tube, said inner tube having pressure distributor means slidably and fixedly positioned between said first and second ends, said inner tube being positioned such that said first end is adjacent to the occlusion to be removed, said second end being adapted to supply water or enzyme solutions to said inner tube, and passing warm water or an enzyme solution through said inner tube while applying a force to the pressure distributor means and providing a rotary and/or oscillatory motion to said inner polycarbonate tube which pushes said tube against said occlusion so as to dislodge and remove said occlusion, the pressure distributor means being adjusted such that said means slide on said inner tube before a force sufficient to perforate said enteral feeding tube is reached.

4,894,057

FLOW ENHANCED MULTI-LUMEN VENOUS CATHETER DEVICE

Randolph M. Howes, 4540 Fort Macomb Rd., New Orleans, La. 70129

Filed Jun. 19, 1987, Ser. No. 63,918
Int. Cl.[4] A61M 25/00
U.S. Cl. 604—280 **11 Claims**

1. A venous catheter device comprising:

an elongated flexible catheter tube having an outer wall, a proximal end and a longitudinally extending distal end portion with a catheter tube distal terminus for insertion into and capable of being fed longitudinally through a vein;

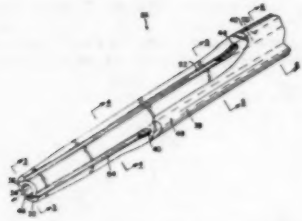
at least three independent lumens extending through said catheter tube including a distal lumen, a middle lumen and a proximal lumen;

each of said lumens having a wall, a proximal end and a lumen distal terminus formed in said longitudinally extending distal end portion;

said lumen distal termini being spaced longitudinally from

each other to define a distal lumen distal terminus, a middle lumen distal terminus, and a proximal lumen distal terminus, respectively;

at least two of said distal lumen termini cooperating with groove means located in the outer wall of said distal end portion and communicating with said at least two distal



lumen termini for providing a flow-enhanced outflow path from said at least two distal lumen termini along the outer wall of said distal end portion, and each of the proximal ends of said lumens including lumen adapter means for permitting connection to independent fluid devices.

4,894,058

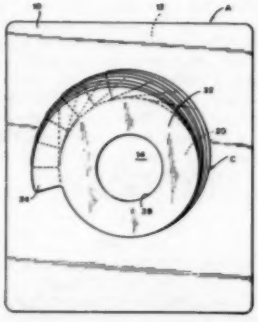
ADHESIVE CONNECTING RINGS FOR AN OSTOMY DEVICE

Ole R. Jensen, River Vale, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Continuation of Ser. No. 145,975, Jan. 20, 1988, abandoned, which is a division of Ser. No. 917,070, Oct. 8, 1986, Pat. No. 4,753,703. This application May 10, 1989, Ser. No. 351,276

Int. Cl.[4] A61F *5/44*

U.S. Cl. 604—332 **1 Claim**



1. An ostomy device comprising a faceplate, adapted for use with a collection pouch, a plurality of stacked adhesive connecting ports on the surface of the faceplate in angularly offset relation, each of said parts comprising a substantially annular base layer adhesively coated on both surfaces and a cover layer situated on one of said adhesively coated base layer surfaces, said cover layer comprising an annular portion which substantially covers said base layer and a radially extending gripping portion defined by a first straight edge extending substantially radially outwardly from said annular portion and a second substantially circumfrentially extending edge of a substantially greater length than said first edge which gradually tapers from said first edge until it is substantially coincident with the peripheral edge of said annular portion, the top one of said parts having a cover layer with a gripping portion which substantially obscures the gripping portions of the underlying parts but is angularly offset therefrom to facilitate removal thereof, each of said parts being adapted to removably mount a collection pouch to said faceplate when the cover layer which forms a portion thereof is removed.

4,894,059

CATHETER APPLICATOR FOR URINARY INCONTINENCE EQUIPMENT

J. K. Larsen, Allerod, and Michael Morris, Copenhagen, both of Denmark, assignors to Coloplast A/S, Denmark

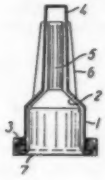
PCT No. PCT/DK86/00105, § 371 Date May 22, 1987, § 102(e) Date May 22, 1987, PCT Pub. No. WO87/01582, PCT Pub. Date Mar. 26, 1987

PCT Filed Sep. 22, 1986, Ser. No. 60,392

Claims priority, application Denmark, Sep. 24, 1985, 4317/85

Int. Cl.[4] A61F *5/44*

U.S. Cl. 604—349 **7 Claims**



1. A male urinary incontinence device comprising a male catheter for external application which includes a draining portion and a rolled-up portion, said rolled-up portion being capable, of unrolling into a substantially cylindrical body of elastic material open at an end farthest from said drainage portion for receiving a male penis; and in contact with said catheter, an applicator having a substantially cylindrical tubular member comprised of material having greater rigidity than said catheter, said tubular member having an opening for receiving part of said catheter other than said rolled-up portion and said tubular member further having an external surface which includes a means for contacting and retaining said rolled-up portion of said male catheter in a position along an outer circumference of said tubular member and of retarding the unrolling of said rolled-up portion until said rolled-up portion is unrolled by a user, said tubular member including a hollow gripping member having an internal cavity capable of encircling the entire length of said drainage portion of said catheter.

4,894,060

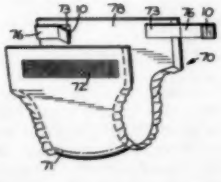
DISPOSABLE DIAPER WITH IMPROVED HOOK FASTENER PORTION

Susan K. Nestegard, Woodbury, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed Jan. 11, 1988, Ser. No. 142,551

Int. Cl.[4] A61F *13/16*

U.S. Cl. 604—391 **13 Claims**



1. A disposable garment or diaper including a flexible lami-

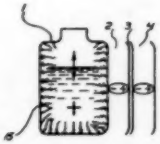
nate adapted to be applied around a portion of an individual, and hook and loop fastener means for fastening together spaced portions of said laminate to secure said garment or diaper to the individual, said fastener means includes at least one loop fastener portion defining loops attached to one of said portions, and at least one unitary hook fastener portion of a resiliently flexible, polymeric resin comprising a base having generally parallel upper and lower major surfaces with said lower surface fastened to a different one of said portions of said laminate, and at least 45 spaced hook members per square centimeter projecting at generally a right angle from the upper surface of said base and adapted to releasably engage the loops of said loop fastener portion, said hook members having a height from said upper surface of less than 1.5 millimeters and each comprising a stem portion attached at one end to said base, and a head portion at the end of said stem portion opposite said base, which head portion has a rounded surface opposite said stem portion, said stem and bead portions having generally the same thickness of less than 0.046 centimeter in a first direction parallel to the surfaces of said backing said stem portion having a width in the range of 0.018 to 0.03 centimeter in a second direction generally at a right angle to said first direction and parallel to the surfaces of said backing; and said head portion having a width at least 0.007 centimeter greater than said stem portion and a total width of less than about 0.1 centimeter in said second direction, the total cross sectional area of said head portions in a plane parallel to said upper surfaces being less than 32 percent of the area of said upper surface.

4,894,061

CONTAINER FOR AND METHOD OF PRESERVING AND INCREASING BACTERICIDAL PROPERTY OF POSITIVE SILVER IONS SOLUTIONS

Meisey Dobruskin, 483 Ocean Pkwy., Brooklyn, N.Y. 11218

Filed Nov. 30, 1987, Ser. No. 126,872
Int. Cl.[4] A61B *19/00*
U.S. Cl. 604—403 17 Claims



15. A container for preserving bactericidal property of positive silver ions solutions, comprising

a wall bounding an inner chamber for accommodating a positive silver ions solution; and

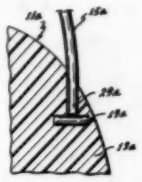
means for supplying additional energy to the positive silver ions solution so as to prevent decrease of electric charge of the positive silver ions solution accommodated in said inner chamber, said means including a layer associated with said wall and electrically charged so as to additionally charge the positive silver ions solution through said wall.

4,894,062

STAKING ANCHOR FOR SOFT IOL

Patrica M. Knight, Laguna Niguel; Vladimir Portnoy, Irvine; F. Richard Christ, Orange; Alan E. Alosio, El Toro; Stanley L. Van Gent, Irvine, and Lyle E. Paul, El Toro, all of Calif., assignors to Allergan, Inc., Irvine, Calif.

Division of Ser. No. 804,674, Dec. 4, 1985, Pat. No. 4,834,751.
This application Dec. 2, 1988, Ser. No. 279,439
Int. Cl.[4] A61F *2/16*
U.S. Cl. 623—6 6 Claims



1. An intraocular lens comprising:

an optic which is deformable to facilitate insertion of the optic through an incision into the eye;

first and second fixation members, each of said fixation members having a proximal end portion;

first and second anchors coupled to the proximal end portions of the first and second fixation members, respectively, at least one of said anchors including a filament extending transversely on both sides of the associated fixation member at the location where said one anchor is coupled to such fixation member, said filament being substantially perpendicular to the associated fixation member at said location;

said optic being molded over said anchors and said proximal end portions;

said anchors and proximal end portions being within peripheral regions of the optic whereby the anchors assist in attaching the fixation members to the optic; and

said anchors being spaced apart whereby the deformable optic can be folded to facilitate insertion of the optic through an incision into the eye.

4,894,063

BARRIER LAYER FOR IMPLANTABLE TENDONS AND LIGAMENTS

Aws S. Nashef, Costa Mesa, Calif., assignor to Baxter International Inc., Deerfield, Ill.

Filed May 24, 1983, Ser. No. 497,490
Int. Cl.[4] A61F *2/08*
U.S. Cl. 623—13 30 Claims

1. A method of interfacing a tendon or ligament within a channel of resected bone, comprising: inserting a substantially cylindrical sleeve having an outer surface of soft biological tissue through a channel of resected bone such that the biological tissue is in contact with said resected bone and a barrier is formed between said resected bone and a tendon or ligament inserted therethrough; said sleeve having a first and second open end portion, a longitudinal passage extending between

said first and second end portions, wherein said longitudinal passage has internal dimensions sufficient to receive a tendon or ligament therethrough, and overall external dimensions sufficient to extend through at least a portion of the resected bone channel.

4,894,064

ENDOPROSTHESIS FOR A HIP-JOINT SOCKET

Martin Imhof, Rotkreuz, Switzerland, assignor to W. Hermann AG, Steinhausen, Switzerland

Filed Nov. 4, 1988, Ser. No. 267,314

Claims priority, application Switzerland, Nov. 9, 1987, 4364/87

Int. Cl.[4] A61F *2/36*

U.S. Cl. 623—22 **7 Claims**

1. An endoprosthesis for a hip-joint socket, comprising:

shell sleeve member capable of receiving a bearing socket;

said shell sleeve member possessing a pole region and an outer surface;

said shell sleeve member possessing the shape of a body of revolution which tapers towards said pole region;

self-tapping thread means provided at said outer surface of said shell sleeve member;

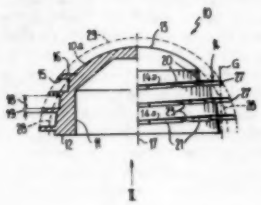
said self-tapping thread means comprising substantially flat upper and lower thread flanks;

said body of revolution defining a lengthwise axis;

said upper and lower thread flanks being parallel and disposed at approximately right angles to said lengthwise axis of said body of revolution;

said self-tapping thread means comprising thread flights which are spaced from one another;

said self-tapping thread means having an essentially constant pitch;



each of said thread flights having cutting means formed therein;

said cutting means being circumferentially spaced from each other along each said thread flight and defining thread portions between each two successive cutting means; and

each one of said thread portions defining a circumferential portion containing an undercut region.

4,894,065

METHOD FOR PRODUCING WOOL DYEINGS OF IMPROVED LEVELNESS AND DYE MIXTURES USEFUL THEREFOR: PARAMETERS FOR COMBINATION CAPACITY AND COMPENSATION OF VARIABLE AFFINITY FOR WOOL FROM ROOT TO TIP OF FIBER

Oskar Annen, Aesch; Wolfgang Beck, Basel, and Josef Fraenknecht, Therwil, all of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

Filed Mar. 3, 1988, Ser. No. 163,444

Claims priority, application Fed. Rep. of Germany, Mar. 4, 1987, 3706909

Int. Cl.[4] C09B 67/22, 69/04; D06P 1/60, 3/16

U.S. Cl. 8—638 21 Claims

1. A mixture of anionic dyestuffs, each anionic dyestuff having a skitteriness value SK′ at pH5 in the range 1 to 5 and a combinability value K′ at pH5 in the range 1 to 10 and said dyestuffs being present in a weight ratio such that the mixture has a value SK′ at pH5 of from 3 to 4 and a value K′ at pH5 of from 4 to 5.

4,894,066

METHOD TO PRODUCE FUEL FROM SOLID URBAN REFUSE, THE METHOD INCLUDING ALSO AN ORGANIC COMPOSTED FRACTION

Luigi Castelli, Trieste, Italy, assignor to Daneco Danieli Ecologia SpA, San Giovanni Al Natisone, Italy

Filed Apr. 19, 1988, Ser. No. 183,221

Claims priority, application Italy, Apr. 28, 1987, 83365 A/87

Int. Cl.[4] C10L 5/40, 5/00

U.S. Cl. 44—589 5 Claims

1. A method for producing fuel from solid urban refuse, comprising composting the organic fraction of the refuse with an accelerated forced-draught system, and mixing the composted organic fraction with dry, mature compost.

4,894,067

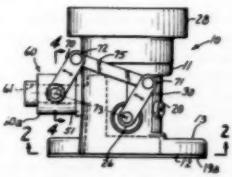
LOW PROFILE GASEOUS FUEL CARBURETOR

Richard Bayerstock, Long Beach, Calif., assignor to Carbumatic B.V., Rijswilk, Netherlands

Filed Nov. 18, 1987, Ser. No. 121,981

Int. Cl.[4] F02M 21/04; G05G 7/02

U.S. Cl. 48—180.1 10 Claims



1. A gaseous fuel carburetor comprising:

a body having a passage wall forming a passage having an axis of downstream flow, an upstream air intake port, and a downstream mixture outlet port, said passage incorporating a reduced venturi between said ports;

an adjustable throttle valve means in said passage, said throttle valve means including a rotatable throttle shaft to set the throttle valve means;

said passage wall having a plurality of gas injector ports opening into said passage so as to discharge gas into said passage, and a plurality of deflector vanes on said passage wall, each vane of said plurality of deflector vanes being upstream from and overhanging a respective injector port, each said deflector vane having an upstream facing face, a downstream facing face and a free tip end, said faces extending from said wall into said passage, and sloping downstream, there being substantial spacings between the tip ends of said vanes and between said vanes to permit unimpeded axial flow of air past them; and

a gas supply conduit connected to said gas injector ports for supplying gas to the injector ports.

10. A gaseous fuel carburetor comprising:

a body having a passage wall forming a passage having an axis of downstream flow, an upstream air intake port, and a downstream mixture outlet port, said passage incorporating a reduced venturi between said ports;

an adjustable throttle valve means in said passage, said throttle valve means including a rotatable throttle shaft to set the throttle valve means;

said passage wall having a plurality of gas injector ports opening into said passage so as to discharge gas into said passage;

a rotary metering valve mounted to said body, said metering valve having an inlet port, a valving chamber, and a valving port in that order, said valving chamber having a cylindrical wall with a valving axis said valving port being disposed in said valving chamber wall, a valve rotor rotatably mounted in said valving chamber, said valve port being connected to said gas supply conduit, and said inlet port being adapted to receive gas to be metered by said metering valve.

said throttle shaft and said valve rotor each having a respective center or rotation, the centers of rotation of said throttle shaft and of said valve rotor being spaced apart by a fixed reference spacing, a throttle lever being fixed to said throttle shaft to rotate it, and a rotor lever being fixed to said rotor to rotate it; and a linkage pivotally attached to pivot pins and disposed on both levers at pivot points equally distant from said centers of rotation to maintain the separation of the pivot points from one another substantially equal to the reference spacing and defining a separation axis, whereby the two shafts rotate simultaneously through substantially equal rotation angles,

said linkage comprising a pair of identical plates held in and laid in flat sliding adjacency to one another, each of said plates having a pair of slots located at opposite ends of the plate defining contact surfaces facing in the same direction along the separation axis to engage a respective pin at a respective pivot point, and said plates being laid reversely relative to one another so that the contact surfaces of one plate face toward the respective contact surfaces of the other plate, the contact surfaces on both plates being spaced apart by a distance equal to the reference spacing, and resilient bias means connected to said plates in tension so as to draw the contact surfaces against respective pivot pins, and the pivot pins having identical dimensions in contact with said contact surfaces.

4,894,068

PROCESS FOR CAPTURING NITROGEN FROM AIR USING GAS SEPARATION MEMBRANES

Arthur W. Rice, O'Fallon, Mo., assignor to Permea, Inc., St. Louis, Mo.

Filed Dec. 27, 1988, Ser. No. 289,836

Int. Cl.[4] B01D 53/22

U.S. Cl. 55—16 5 Claims

1. A process for producing refined relatively pure nitrogen gas wherein the oxygen level is less than about 2,000 ppm from air, the process comprising:

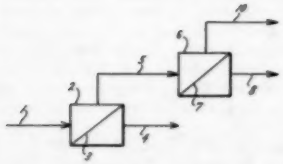
(a) moving compressed air into a first separator containing a first set of a plurality of hollow fiber membranes confined in a container, the first separator being adapted to permit selectively the passage therethrough of oxygen, carbon dioxide and water vapor while restraining the passage therethrough of nitrogen;

(b) maintaining a pressure differential between the bore surface of the hollow fiber membranes and the external surface of the hollow fibers membranes;

(c) moving the resulting nonpermeate gas longitudinally through the bores of the hollow fiber membranes and out the ends of the hollow fiber membranes and from the first separator;

(d) venting the resulting permeate gas from the external surfaces of the membranes in the first separator;

(e) moving the resulting nonpermeate gas whose nitrogen content has been increased as compared to the source air and whose oxygen content has been significantly reduced as compared to the source air from the first separator without additional compressional forces being applied thereto into internal contact with a second separator containing a second set of a plurality of hollow fiber membranes confined in a container, the separator being



adapted to permit selectively the passage therethrough of oxygen, carbon dioxide and water vapor while restraining the passage therethrough of nitrogen;

(f) maintaining a pressure differential between the bore surface of the second set of hollow fiber membranes and the external surface of the second set of hollow fiber membranes;

(g) moving the nonpermeate gas longitudinally through the bores of the second set of hollow fiber membranes and out the ends of the second set of hollow fiber membranes and from the second separator;

(h) venting the resulting permeate gas from the external surfaces of the membranes in the second separator; and

(i) thereafter collecting under pressure the nonpermeate gas from the second separator.

4,894,069

METHOD OF CONVEYING AN ESSENTIALLY GASEOUS FLUID THROUGH A PIPE

Marcel Arnaudeau, Paris, France, assignor to Institut Francais du Petrole, Rueil-Malmaison, France

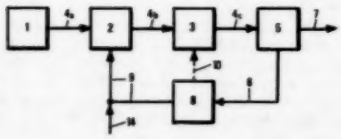
Continuation-in-part of Ser. No. 802,904, Nov. 29, 1985, abandoned, which is a continuation of Ser. No. 343,624, Jan. 28, 1982, abandoned, and a continuation of Ser. No. 11,818, Feb. 13, 1979, Pat. No. 4,325,712. This application Jun. 28, 1988, Ser. No. 212,079

Claims priority, application France, Feb. 13, 1978, 78 04331

The portion of the term of this patent subsequent to Jan. 12, 1999, has been disclaimed.

Int. Cl.[4] B01D *47/00*

U.S. Cl. 55—89 **16 Claims**



1. A method for pressurizing and conveying a substantially gaseous fluid from a site of a geological source to a remote location through a pipe having an inlet connected to the geological source from which the gaseous fluid is obtained, which method comprises the steps of:

(a) establishing communication between said pipe and a pump having an outlet and an inlet, the pump being capable of pumping and increasing the pressure of diphasic fluids;

(b) admixing said substantially gaseous fluid with a liquid at the inlet of the pump to produce diphasic fluid comprising a mixture of a gas and a liquid, sufficient liquid being added in said mixing for producing a diphasic fluid having a gas-to-liquid volumetric ratio substantially equal to the maximum value capable of being pumped by the pump;

(c) pumping and increasing the pressure of the diphasic fluid from step (b) with the pump capable of pumping and increasing the pressure of diphasic fluids for producing a pressurized diphasic fluid, this pressurized diphasic fluid comprising a gaseous phase and a liquid phase; and

(d) conveying the pressurized diphasic fluid from step (c) through the pipe to said remote location.

4,894,070

FILTRATION OF FLUID MEDIA

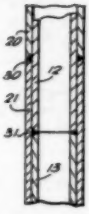
Wolfram Keidel; Wilhelm Barlag, and Rolf Loos, all of Borken, Fed. Rep. of Germany, assignors to Foseco International Limited, Birmingham, England

Filed Nov. 10, 1988, Ser. No. 269,826

Claims priority, application Fed. Rep. of Germany, Nov. 13, 1987, 8715130

Int. Cl.[4] B01D *29/32, 46/24*

U.S. Cl. 55—96 **15 Claims**



1. A method of filtering particulate matter from a fluid media comprising the steps of providing an elongated tubular porous ceramic filter, forming said filter by forming a plurality of tubular portions formed of ceramic fiber and a binder in two different diameters, overlapping the tubular portions of different diameters one with the other with a first set thereof received within a second set thereof, and bonding the sets of tubular portions in end-to-end relation respectively, using an adhesive at bonding points therebetween such that the end-to-end bonding points of the two different sets of tubular portions are axially offset one from the other, and passing the media through the elongated tubular porous ceramic filter so that fluid passes through the filter body, but the particulate matter does not.

4. An elongated tubular filter comprising:

a plurality of porous ceramic material tubular portions, each tubular portion comprising ceramic fiber and a binder;

said plurality of tubular portions comprising a first plurality having a first cross-sectional area, and further comprising a second plurality having a second cross-sectional area greater than said first cross-sectional area, so that said second portions are adapted to receive said first portions therein; and

means for holding said first and second pluralities of said tubular portions in axially aligned end-to-end relation, respectively, to form a composite elongated tubular filter, comprising means defining an overlapping configuration of the portions including said second portions receiving

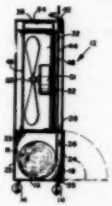
said first portions, and an adhesive at bonding points associated with said overlapping configuration including between the ends of said axially aligned first and second pluralities of said tubular portions, respectively, and wherein the bonding points between the portions of said first plurality are off-set axially with respect to the bonding points between said second plurality.

4,894,071

PORTABLE AIR CLEANER

Max Klein, Shrewsbury, N.J., assignor to Tech Paper, Inc., Pittsfield, Mass.

Filed Sep. 27, 1988, Ser. No. 249,855
Int. Cl.[4] B01D 46/00
U.S. Cl. 55—97 **18 Claims**



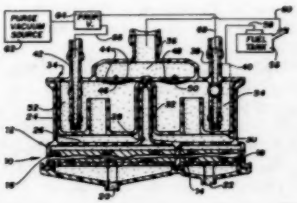
1. A method of cleaning air from pollutants in a workshop having a free space comprising the steps of providing a free-standing hollow frame having an open front, an open back, and an axial fan therein, placing a sheet of filter medium across the open front of said casing so that operation of the fan draws air from the free space into the casing through said sheet of filter medium and discharges the air to said free space, placing said frame in the vicinity of a pollution-generating location within the workshop so that the open front and open back of the frame communicate with said free space, energizing said fan to create a substantial flow of air through said open front and open back of said frame and said sheet of filter medium, said flow causing pollutants entrained in the air to lodge in said filter medium, periodically removing at least a portion of said sheet of filter medium from said frame and replacing it with a fresh sheet of filter medium, and disposing of the pollutants lodged in said removed sheet of filter medium.

4,894,072

HIGH EFFICIENCY VAPOR STORAGE CANISTER

Kenneth W. Turner, Webster; Charles H. Covert, Manchester, and Patti S. DuBois, Hamlin, all of N.Y., assignors to General Motors Corporation, Detroit, Mich.

Filed Mar. 27, 1989, Ser. No. 328,916
Int. Cl.[4] B01D 53/04
U.S. Cl. 55—179 **2 Claims**



1. For use in a vehicle having a fuel tank from which a relatively smaller volume of diurnal fuel vapors is continually generated, and from which a relatively larger volume of fuel fill vapors is displaced less frequently during the fill operation, and also having a source of purge air, a vapor storage canister providing improved efficiency in the storage and purging of both said diurnal and said fuel fill vapors, said canister comprising,

a generally elongated, adsorbent filled housing having a total volume partitioned into a pair of separate bed portions, including a relatively larger first bed portion, and a relatively smaller second bed portion having just sufficient capacity to store said diurnal fuel vapors,

a diurnal vapor inlet opening only to said second bed portion,

a fill vapor inlet opening to both said first and second bed portions and adapted to distribute said fuel fill vapors simultaneously to each of said first and second bed portions in proportion to the ratio of its particular volume to the total volume, and,

purge means allowing purge air to be selectively applied to said bed portions,

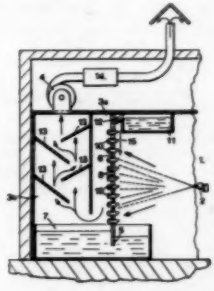
whereby, said second bed portion may be loaded separately by said diurnal vapors only and later purged more thoroughly by a given volume of purge air than would an adsorbent bed of greater volume purged by the same volume of purge air, and during fuel fill, both bed portions may be loaded simultaneously and substantially at the same rate by said fuel fill vapors and then purged later, thereby giving an effective capacity substantially equal to a single bed with a volume equal to both of said bed portions.

4,894,073

FILTER

Erhard C. Andreae, CH - 1122, Romanel-sur-Morges, Switzerland

Filed Mar. 23, 1989, Ser. No. 327,554
Claims priority, application United Kingdom, Apr. 9, 1988, 8808372
Int. Cl.[4] B01D 47/00
U.S. Cl. 55—240 **4 Claims**



1. Apparatus comprising: a housing defining a vacuum chamber; a wet wall comprising at least part of the housing, which wet wall is provided with a plurality of through holes including a plurality of tubes positioned in the holes which tubes communicate respectively with the vacuum chamber and with the surroundings of the housing; a plurality of deflector means situated in the vacuum chamber and being spaced from said tubes; a liquid source; and a liquid collecting tank, which tank communicates with both the vacuum chamber and said surroundings and into which tank the wet wall extends; said liquid source being located such that liquid therefrom flows over a surface of the wet wall external to the housing, and is drawn together with air from the surroundings and any impurities carried in that air, via the plurality of tubes, into the vacuum chamber as a liquid-air mixture, the movement of this

liquid-air mixture in a direction parallel to the tubes being impeded by the deflector means.

4,894,074

FILTER FOR CLEANING EXHAUST GASES OF DIESEL ENGINES

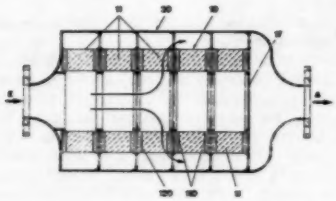
Tiberiu Misrah, Schaffhausen; Albert Maurer, Thayngen, and Jean-Pierre Gabathuler, Schaffhausen, all of Switzerland, assignors to Swiss Aluminium Ltd., Chippis, Switzerland

Filed Oct. 28, 1988, Ser. No. 264,265

Claims priority, application Switzerland, Nov. 18, 1987, 4504/87

Int. Cl.[4] F01N *3/02*

U.S. Cl. 55—482 **4 Claims**



1. Filter for cleaning exhaust gases which comprises: a filter cup having an active filter section; an end plate made of gas-impermeable material as an insert for said filter cup; hollow cylindrical open-pore ceramic foam elements in said active filter section having a cylinder axis and end faces thereof; wherein exhaust gases flow through the active filter section essentially perpendicularly to the cylinder axis; and level, plane parallel, temperature resistant and thermal shock-resistant layers of material which are plastic at room temperature bonded on said end faces, thereby precluding bending moments from breaking the ceramic foam elements in the use, wherein said ceramic foam elements comprise cylindrical elements with two end faces with said bonded layers on each end face thereof, and including a plurality of said ceramic foam elements with bonded layers assembled in said filter cup.

4,894,075

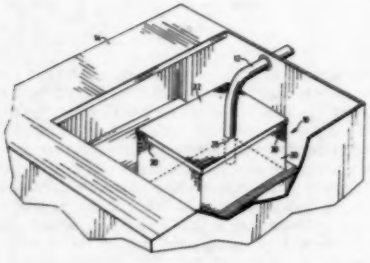
FILTER FOR A FLUIDIZED BED POWDER COATING APPARATUS

Richard A. Gerrard, Brantford, Canada, assignor to Richard A. Gerrard, Brantford, Canada

Filed Mar. 9, 1989, Ser. No. 321,093

Int. Cl.[4] B01D *46/00*

U.S. Cl. 55—484 **8 Claims**



1. A filter for a fluidized bed powder coating apparatus, said apparatus having a fluidized hopper in which powder coating particles are maintained in a fluidized state by the flow of air therethrough, and having a tubular conduit extending from the fluidized hopper through which powder coating particles may exit the hopper, the filter comprising:

an enclosure sized to fit within the hopper, the enclosure having a fitting for receiving an end portion of the tubular conduit and having a wall defining a plurality of apertures each being from about 1 mm to about 5 mm in diameter, the powder coating particles being required to pass through the filter before entering the tubular conduit.

4,894,076

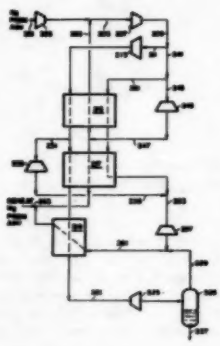
RECYCLE LIQUEFIER PROCESS

Thaddeus N. Dobrucki, Emmaus; John D. Dubbs, Coopersburg; Roger M. McGuinness, Macungie, and Janice C. Peterson, Allentown, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Jan. 17, 1989, Ser. No. 297,463

Int. Cl.[4] F25J *1/00*

U.S. Cl. 62—9 **9 Claims**



1. A process for the liquefaction of an atmospheric gas comprising:

(a) compressing in a compression zone one or more atmospheric gas feed streams to produce an intermediate pressure stream and a high pressure stream;

(b) cooling the high pressure stream;

(c) removing at least a portion of the high pressure stream as a high pressure stream, side-stream and expanding the high pressure stream, side-stream in a first expansion step thereby providing refrigeration and producing a first expansion discharge;

(d) further cooling and expanding the cooled high pressure stream in a second expansion step thereby producing a partially liquefied second expansion discharge;

(e) phase separating the partially liquefied second expansion discharge into a vapor stream and a liquid product stream;

(f) removing at least a portion of the intermediate pressure stream as an intermediate pressure stream, side-stream and expanding the intermediate pressure stream, side-stream in a third expansion step, thus providing refrigeration and producing a third expansion discharge;

(g) cooling the intermediate pressure stream;

(h) combining the cooled intermediate pressure stream of step (g) the first expansion discharge of step (c) to form a first combined stream, and expanding the first combined stream in a fourth expansion step, thus providing refrigeration and producing a fourth expansion discharge; and

(i) warming and subsequently recycling to the compression zone the fourth expansion discharge of step (h), the vapor stream from step (e) and the third expansion discharge of step (f).

4,894,077
METHOD OF ACCUMULATING AND RESTITUTING COLD AND DEVICE FOR IMPLEMENTING SUCH METHOD

Laszlo Simon, Satigny, and Jean Pfau, Collonge-Bellerive, both of Switzerland, assignors to Coldeco S.A., Carouge, Switzerland

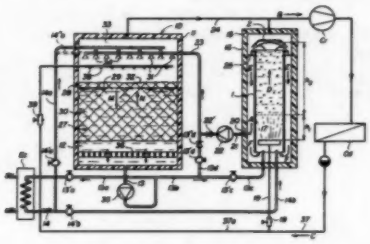
PCT No. PCT/CH87/00007, § 371 Date Nov. 18, 1987, § 102(e) Date Nov. 18, 1987, PCT Pub. No. WO87/04509, PCT Pub. Date Jul. 30, 1987

PCT Filed Jan. 16, 1987, Ser. No. 110,691

Claims priority, application Switzerland, Jan. 18, 1986, 00180/86

Int. Cl.[4] F25D *3/00*

U.S. Cl. 62—59 23 Claims



1. In a method of accumulating and restituting cold, wherein, during cold-accumulating phases, in a storage vessel containing a mass of cold-accumulating and cooling liquid, a cluster of rigid aggregates of crystals of said liquid is accumulated in a frozen state, and wherein, during cold-restitution phases, the cold accumulated in said storage vessel is restituted to a utilization circuit comprising at least one heat exchanger by fusion of said crystals in said vessel, by circulating a stream of said liquid in a closed circuit successively through said cluster and said utilization circuit, the improvement wherein during the cold-accumulation phases, a rigid piston is created formed of a porous compact cluster of said crystal aggregates, of uniform thickness and height and of homogeneous structure, free from cavities, free spaces and other defects of macroscopic homogeneity of its structure, said piston being impregnated with cold-accumulating and cooling liquid, up to the height of a free surface of said mass of liquid, said piston being created by forming said rigid crystal aggregated directly in said vessel on the upper surface of said cluster and by uniformly resorbing said piston from the top, in the course of said cold-restitution phases, by uniformly spraying an upper surface thereof with cold-accumulating and cooling liquid which is withdrawn at the bottom of said storage vessel and reheated above its freezing temperature after passage thereof in the utilization circuit, and wherein said piston is permitted to slide freely, as a whole, along the vertical wall surfaces of said storage vessel, downwardly during the cold-accumulation phases and upwardly during the cold-restitution phases whereby to maintain the integrity of the structure of said piston.

4,894,078
METHOD AND APPARATUS FOR PRODUCING OPTICAL FIBER

Hiroaki Takimoto, and Katsuji Sakamoto, both of Yokohama, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Oct. 3, 1988, Ser. No. 252,107

Claims priority, application Japan, Oct. 14, 1987, 62-257234

Int. Cl.[4] C03C *25/02*

U.S. Cl. 65—3.4 4 Claims

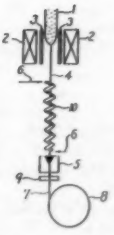
1. A method for producing an optical fiber comprising the steps of:

drawing a fiber from a preform for an optical fiber which is heated and melted by a heating source at a constant tension,

cooling the drawn fiber by use of a cooling gas blown from a non-symmetrical blowout hole layout in such a manner that, in one of a first plane which is perpendicular to an axis of the drawn fiber and a first conical surface which has a cone point on the axis of the drawn fiber, the cooling gas is blown against the fiber from one direction on one of said first plane and said first cone surface, and in one of a second plane which is perpendicular to the axis of the drawn fiber and apart from said first plane and a second conical surface which has a cone point on the axis of the drawn fiber and is apart from said first conical surface, the cooling gas is blown against the fiber from another direction on one of said second plane and said second conical surface so that a sum of components of all vectors of the cooling gas in x and y dimensions in a three-dimensional space having a z dimension in the drawn fiber direction is substantially zero where a length and a direction of the vector are represented by a flow rate and a direction of the cooling gas, respectively, and then

coating the cooled fiber with a resin melt to obtain a finished optical fiber.

2. An apparatus for producing an optical fiber comprising:



means for drawing a fiber from a preform for an optical fiber which is heated and melted by a heating source and drawn at a constant tension,

a pipe means for cooling the drawn fiber which has blowout holes arranged in a non-symmetrical layout such that, in one of a first plane which is perpendicular to an axis of the drawn fiber and a first conical surface which has a cone point on the axis of the drawn fiber, the cooling gas is blown against the fiber from one blowout hole, and in one of a second plane which is perpendicular to the axis of the drawn fiber and apart from said first plane and a second conical surface which has a cone point on the axis of the drawn fiber and is apart from said first conical surface, the cooling gas is blown against the fiber from a second blowout fiber hole such that a sum of components of all vectors of the cooling gas in x and y dimensions in a three-dimensional space, within said pipe means, with a z dimension in the drawn fiber direction is substantially zero where a length and a direction of the vector are represented by a flow rate and a direction of the cooling gas, respectively, and which is provided around the drawn fiber,

means for coating the cooled fiber with a resin melt to obtain a finished optical fiber.

4,894,079

METHOD AND APPARATUS FOR SUPPLYING GLASS FORMING RAW MATERIAL

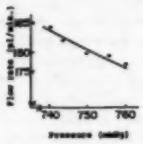
Akio Shioni, Yokohama, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed May 17, 1989, Ser. No. 353,033

Claims priority, application Japan, May 17, 1988, 63-118069

Int. Cl.[4] C03B *37/018*

U.S. Cl. 65—3.12 **3 Claims**



1. A method for supplying a glass forming raw material in a reactor, which method comprises bubbling a carrier gas into a liquid glass forming raw material contained in a container and supplying a mixture of the glass forming raw material and the carrier gas in the reactor, wherein pressure of an atmosphere surrounding said container and said reactor is kept constant.

3. An apparatus for supplying a glass forming raw material in a reactor, which apparatus comprises a container for containing a glass forming raw material, means for bubbling a carrier gas in the glass forming raw materiel, a pressure adjusting room in which said container and said reactor are installed and means for adjusting pressure in said pressure adjusting room so as to keep said pressure constant.

4,894,080

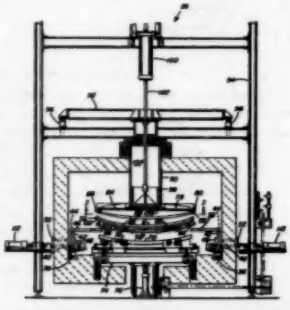
IN-LEHR GLASS SHEET PRESS BENDING USING PRESSURIZED GAS

Thomas J. Reese, Buffalo Township, Butler County, and Joseph J. Fisher, Oakmont, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Sep. 26, 1988, Ser. No. 248,679

Int. Cl.[4] C03B *23/023*

U.S. Cl. 65—106 **14 Claims**



1. An apparatus for shaping heat softened sheet material to a predetermined shape comprising:

a first mold having a full surface press face and a shaping surface contoured to generally correspond to the final desired curvature of said sheet to be shaped;

a second mold having a peripheral shaping surface corresponding to the final desired contour of the periphery of the sheet to be shaped and complimenting a corresponding portion of said shaping surface of said first mold, and a chamber defined by said peripheral shaping member;

means to support and position said sheet to be shaped;

means to position said support means between said first and second molds;

means to move said first and second molds and said support means relative to each other to lift said sheet off said support means and engage said sheet between said first and second molds; and

means to apply a fluid force to a central portion of said sheet to be shaped to urge said sheet toward said first mold press face when said sheet is engaged between said molds.

4,894,081

SPHERULIZING FURNACE

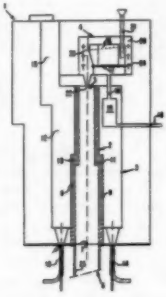
Hubert Neusy, Montignies-sur-Sambre, Belgium, assignor to Glaverbel, Brussels, Belgium

Filed Jul. 8, 1988, Ser. No. 216,646

Claims priority, application United Kingdom, Jul. 9, 1987, 8716188

Int. Cl.[4] C03B *19/10*

U.S. Cl. 65—142 **15 Claims**



1. A spherulizing furnace for manufacturing vitreous beads, comprising:

a chamber;

means for heating the chamber;

feed means for delivering a particulate feedstock to one end of the chamber; and

means for collecting vitreous beads from another end of the chamber,

wherein the chamber comprises a pair of opposed walls which are spaced apart by a distance less than their breadth and which are angled to the horizontal so that the chamber has an upper end and a lower end, the feed means is arranged to deliver feedstock to the upper end of the chamber so that the feedstock can pass through the chamber under gravity, and the means for heating the chamber is arranged to heat at least one wall of the pair of opposed walls so that feedstock passing between the pair of opposed walls is heated by radiant heat.

4,894,082

N-SULPHONYL-N-(N'-PHOSPHONOMETHYLGLYCYL-)AMINE

Guy Berrod, and Guy Lacroix, both of Lyons, France, assignors to Rhone-Poulenc Agrochimie, Lyons, France

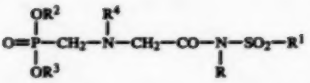
Division of Ser. No. 635,226, Jul. 27, 1984, Pat. No. 4,738,708. This application Apr. 14, 1988, Ser. No. 181,489

Claims priority, application France, Jul. 27, 1983, 83 12620; Feb. 23, 1984, 84 02988

Int. Cl.[4] C07F *9/40*; A01N *57/04*

U.S. Cl. 71—87 **21 Claims**

1. A compound of the formula



and the agriculturally acceptable salts thereof in which: R^1 denotes a hydrocarbon radical of 1 to 18 carbon atoms selected from alkyl, aryl and cycloalkyl radicals, said hydrocarbon radical being optionally substituted by one or more of the groups of haloen, phenyl, cyano, alkoxy and alkylcarboxylate; R denotes a hydrogen atom or has one of the meanings given for R^1; R^2 and R^3 are selected from alkyl and aryl groups which are optionally substituted by one or more halogen, phenyl, cyano, alkoxy and alkylcarboxylate groups; R^4 denotes a hydrogen atom or a hydrogenolyzable group.

14. A process for weeding, in which an effective dose of an active ingredient according to claim 1 is applied in contact with the leaves of the plants to be eliminated.

4,894,083

HERBICIDAL EPOXIDES

Hermann Rempfler, Ettingen, and Walter Kunz, Oberwil, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

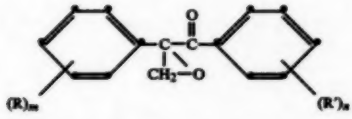
Continuation-in-part of Ser. No. 934,298, Nov. 24, 1986, Pat. No. 4,849,007. This application Feb. 29, 1988, Ser. No. 161,812

Claims priority, application Switzerland, Dec. 2, 1985, 5131/85; Jun. 30, 1986, 2617/86

Int. Cl.[4] A01N *43/20*; C07D *303/32*

U.S. Cl. 71—88 12 Claims

1. A herbicidal and plant growth regulating composition which contains as active ingredient an effective amount of a 2-benzoyl-2-phenyloxirane of formula I



(I)

wherein each of m and n independently of the other is 0, 1, 2 or 3 and each of R and R' independently of the other is a halogen atom, a C_1–C_4alkyl, C_1–C_4alkoxy, C_1–C_4haloalkyl or C_1–C_4 haloalkoxy group or the nitro or cyano group or a phenoxy group which is substituted by $(R)_m$, in the form of a racemate or an optically active enantiomer, together with inert adjuvants selected from (a) solid carriers with or without surfactants and (b) liquid carriers plus effective amounts of surfactants.

4,894,084

SUBSTITUTED QUINOLINONYL AND DIHYDROQUINOLINONYL TRIAZOLINONE HERBICIDES

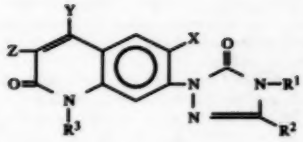
George Theodoridis, Princeton, N.J., assignor to FMC Corporation, Philadelphia, Pa.

Filed Dec. 29, 1987, Ser. No. 138,975

Int. Cl.[4] A01N *43/64*; C07D *401/04*

U.S. Cl. 71—92 28 Claims

1. An herbicidal compound of the formula



in which:

R^3 is H, alkyl, alkenyl, alkynyl, haloalkyl, haloalkenyl, alkoxyalkyl, alkoxyalkoxyalkyl, cycloalkyl, alkylthioalkyl, aralkyl, cyanoalkyl, alkoxycarbonylalkyl, hydroxy, or alkoxy;

X is H, halogen, alkyl, or haloalkyl;

Y is H, halogen, alkyl, haloalkyl, alkoxycarbonyl, cyano, or nitro;

Z is H, halogen, alkyl, haloalkyl, alkoxy, alkenyl, alkynyl, haloalkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl, alkoxycarbonyl, cyano, or nitro;

R^1 is alkyl, alkenyl, alkynyl, haloalkyl, alkoxyalkyl, or haloalkoxyalkyl; and

R^2 is alkyl, haloalkyl, alkoxy, haloalkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl, or halogen.

4,894,085

HERBICIDAL CYANOFLUOROPHENOXYPHENOXYALKANOIC ACIDS AND DERIVATIVES THEREOF

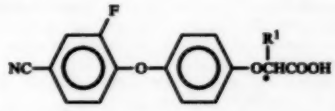
R. Garth Pews, Midland, Mich.; Lucinda A. Jackson, Pleasant Hill, Calif., and Christyn M. Carson, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 82,030, Aug. 5, 1987, abandoned. This application Nov. 29, 1988, Ser. No. 277,619

Int. Cl.[4] A01N *37/40*

U.S. Cl. 71—105 35 Claims

1. A herbicidally active compound or a resolved optically-active isomer thereof having the formula



wherein R^1 represents a C_1–C_3 alkyl group; or an agriculturally acceptable derivative of the alkanoic acid group thereof that can be hydrolyzed and/or oxidized in plants or soil to said alkanoic acid moiety that, depending on the pH, is in the undissociated and/or dissociated form.

4,894,086

METHOD OF PRODUCING DISPERSION HARDENED METAL ALLOYS

Werner Huether, Karlsfeld; Wolfgang Betz, Gauting, and Gerhard Andreas, Munich, all of Fed. Rep. of Germany, assignors to MTU- Motoren-und Turbinen-Union Munchen GmbH, Munich, Fed. Rep. of Germany

Filed May 6, 1988, Ser. No. 190,993

Claims priority, application Fed. Rep. of Germany, May 13, 1987, 3715979

Int. Cl.[4] B22F *3/12*, *5/00*

U.S. Cl. 75—0.5 A 16 Claims

1. In a method of producing a dispersion hardened metal alloy for structural parts of complicated shape which are resistant to high temperatures, in which particles of a second phase are integrated into a metallic matrix by forming a colloidal suspension of said particles in a salt solution of the metal alloy, the particles of the second phase being non reactive with the metals and their salt solution, adding a deglomerating agent to

the solution, spraying the solution, to form atomized particles thereof, removing the solvent of the solution and reducing the atomized particles to form powders of the metal matrix with said particles of the second phase integrated therein, the improvement comprising

forming integrated dispersed powders of metal matrix and reactive metals using as starting materials for said solution a salt of a reducible metal and admixing as the second phase to the salt solution, powder particles of metals or their alloys whose salts or oxides cannot be subjected directly to a reduction process whereby highly reactive metals are alloys whose salts and oxides are non reducible and integrated into the produced powders.

4,894,087

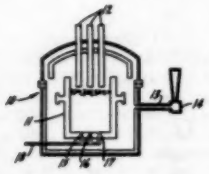
SIMPLIFIED METHOD AND APPARATUS FOR TREATING MOLTEN STEEL

Charles W. Finkl; Bruce Linnatalnen, both of Chicago, and Herbert S. Philbrick, Jr., Wilmette, all of Ill., assignors to A. Finkl & Sons Co., Chicago, Ill.

Continuation-in-part of Ser. No. 910,704, Sep. 23, 1988, Pat. No. 4,780,134. This application Oct. 24, 1988, Ser. No. 261,444

Int. Cl.[4] C22B 4/00; C21C 7/10

U.S. Cl. 75—10.39 **20 Claims**



1. In a method of decreasing the content of undesired gasses in molten steel the steps comprising

isolating molten steel having a content of undersired gasses and/or sources thereof from ambient atmosphere which, upon solidification, would result in an unacceptably high final content of said gasses from the atmosphere, whereby a non-atmospheric region is established above the molten steel,

passing a purging agent upwardly through the molten steel from a location beneath the surface exposed to a non-atmospheric region,

diverting gasses in the region above the molten steel to air ejector means at a rate sufficient to create a sub-atmospheric pressure in the region above the molten steel, and

discharging the gasses drawn from the region above the molten steel, and additional gasses which may be added to the air ejector means, toward a baghouse containing bag means from the air ejector means at a temperature which is within the temperature tolerance range of the baghouse.

4,894,088

PELLET FOR FABRICATING METAL MATRIX COMPOSITE AND METHOD OF PREPARING THE PELLET

Yoshihiro Yamaguchi; Hiroyuki Murata, both of Kobe; Shunichi Minakami, Akashi; Kenichiro Ohuchi, Kobe; Hiroyuki Morimoto, Himeji, and Jun Hirose, Kobe, all of Japan, assignors to Kobushiki Kaisha Kobe Seiko Sho, Kobe, Japan

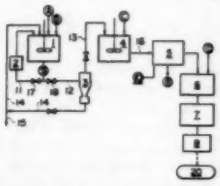
Filed Dec. 15, 1987, Ser. No. 133,434

Claims priority, application Japan, Dec. 16, 1986, 61-300540

Int. Cl.[4] C22C 29/12

U.S. Cl. 75—232 **14 Claims**

1. A pellet consisting essentially of a mixture of a matrix member of a metal powder and at least one reinforcement selected from whiskers, short fibers and particles, the reinforcement being uniformly distributed in a matrix of the metal powder and said mixture being kept in a shape with a binder, wherein said pellet has a surface layer of dried and rigid portion of said mixture which is rigid enough to keep its shape under an external compressing force applied thereto.



4,894,089

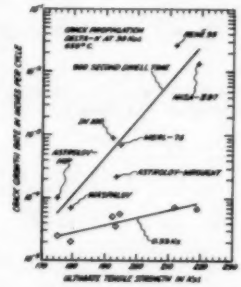
NICKEL BASE SUPERALLOYS

Michael F. Henry, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Oct. 2, 1987, Ser. No. 103,851

Int. Cl.[4] C22C 29/14, 29/00

U.S. Cl. 75—246 **6 Claims**



1. As a composition of matter an alloy containing the following ingredients in the follow proportions:

Ingredient	Concentration in weight % Claimed Composition	
	From	To
Ni	balance	
Co	12	18
Cr	7	13
Mo	2	4
Al	3	5
Ti	3.5	5.5
Ta	6	8
Nb	0.5	2.5
Re	0.0	3.0
Hf	0.0	0.75
Zr	0.00	0.10
V	0.0	2.0
C	0.0	0.20
B	0.01	0.10
W	0.0	1.0
Y	0.0	0.1

4,894,090

POWDER PARTICLES FOR FINE-GRAINED HARD MATERIAL ALLOYS

Carl S. G. Ekemar, Saltsjö-Boo, and Rolf G. Oskarsson, Rönninge, both of Sweden, assignors to Santrade Limited, Luzern, Switzerland

Continuation of Ser. No. 906,437, Sep. 12, 1986, abandoned. This application Feb. 25, 1988, Ser. No. 163,155

Claims priority, application Sweden, Sep. 12, 1985, 8504167

Int. Cl.[4] B22F 9/00

U.S. Cl. 75—252 8 Claims

1. Powder particles for the preparation of a fine-grained hard material alloy for cutting tools consisting essentially of hard principles and binder metal with greater contents of hard principles than in high speed steel, in which the hard principles are compounds of one or more elements in the groups IVA, VA and VIA of the periodical system and Si with C, N and/or B, and the binder metal being based upon Fe, Co and/or Ni, characterized in that the hard principles are formed in situ, the particle is composed of binder metal alloy in an effective binding with the fine-grained hard principles, the volume fraction of hard principles in the particles is 35–90 percent by volume and where Si, Ti, Zr, Hf, V, Nb and/or Ta are ≧55 atomic percent of the hard principle forming metals, balance being Cr, Mo and/or W, and the mean size of the particles is 1–16 μm and at the most 5% of the number of particles have a size of >30 μm.

4,894,091

PHENOLIC BENZOTHIAZOLE DERIVATIVES AND THEIR USE AS CORROSION INHIBITORS

Adalbert Braig, Weil-Friedlingen, Fed. Rep. of Germany; Hans-Rudolf Meier; David G. Leppard, both of Marly, Switzerland; Robert C. Wasson, and Emyr Phillips, both of Cheshire, England, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

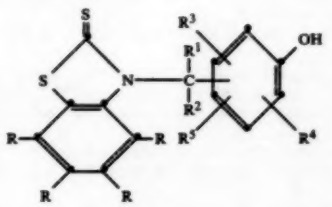
Filed Aug. 17, 1987, Ser. No. 86,337

Claims priority, application United Kingdom, Aug. 27, 1986, 8620668

Int. Cl.[4] C04B 9/02

U.S. Cl. 106—14.16 19 Claims

1. A composition composed of a coating material and containing 0.1 to 20% by weight, based on the solids content of the coating material, of at least one compound of the formula I



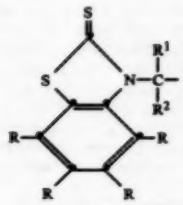
(I)

in which each R independently of one another is hydrogen, C_1–C_{12}-alkyl, C_1–C_4-halogenalkyl, C_1–C_{12}-alkoxy, C_1–C_{12}-alkylthio, phenylthio, benzylthio, C_1–C_{12}-alkylsulfonyl, phenyl, C_7–C_{15}-alkylphenyl, C_7–C_{10}-phenylalkyl, C_5–C_8-cycloalkyl, halogen, —NO_2, —CN, —COOH, —COO—(C_1–C_4-alkyl), —OH, —NH_2, —NHR^6, —$N(R^6)_2$, —$CONH_2$, —$CONHR^6$ or —$CON(R^6)_2$,

R^1 is hydrogen, C_1–C_{12}-alkyl, phenyl, phenyl which is substituted by halogen, C_1–C_4-alkyl, C_1–C_4-alkoxy or —NO_2, pyridyl, thienyl, or furyl,

R^2 is hydrogen or C_1–C_4-alkyl,

R^3 and R^4 independently of one another are hydrogen, halogen, C_1–C_4-alkoxy, cyano, nitro, C_1–C_{20}-alkyl, —$(CH_2)_m$—$COOR^7$, —$(CH_2)_m$—$CONHR^6$, —$(CH_2)_m$—$CON(R^6)_2$, C_3–C_{20}-alkenyl, C_7–C_{10}-phenylalkyl, phenyl, cyclohexyl, cyclopentyl or a group of the formula II



(II)

R^5 is hydrogen, C_1–C_{20}-alkyl, C_3–C_{20}-alkenyl or hydroxy, or R^3 and R_5 together or R^4 and R^5 together form a ring fused to the phenolic moiety which ring may be a carbocyclic or heterocyclic ring containing oxygen, nitrogen or sulfur as heteroatoms, each ring being optionally substituted by C_1–C_4-alkyl, C_1–C_4-alkoxy or halogen,

R^6 is C_1–C_{12}-alkyl, C_3–C_{12}-alkyl which is interrupted by one or more O atoms, C_5–C_8-cycloalkyl, benzyl, phenyl, or phenyl which is substituted by halogen, C_1–C_4-alkyl, C_1–C_4-alkoxy or nitro, or —$N(R^6)_2$ is a pyrrolidino, piperidino or morpholino group, R^7 is hydrogen or C_1–C_{20}-alkyl, which may be substituted by halogen or hydroxyl or R^7 is C_3–C_{20}-alkyl which is interrupted by one or more oxygen atoms and may be substituted by hydroxyl and m is 0, 1 or 2.

4,894,092

PROCESS FOR PREPARING COATED HEAT-RESISTANT PIGMENT

Akira Nishihara, and Makoto Tsunashima, both of Tokyo, Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 14, 1987, Ser. No. 38,219

Claims priority, application Japan, Jun. 20, 1986, 61-142811

Int. Cl.[4] C09C 1/10; C08J 7/04

U.S. Cl. 106—452 18 Claims

1. A process for preparing a coated heat-resistant cadmium-based pigment consisting essentially of:

(a) contacting a hydrophilic cadmium-based pigment with a mixture of a metal alkoxide selected from the group consisting of an alkoxide of boron, silicon, titanium, zirconium and zinc, and a water-miscible or semi-water-miscible solvent to form a primary coating;

(b) repeating the above procedure at least once more to form a secondary coating or secondary and further coatings; and

(c) collecting the thus coated pigment and drying the same.

4,894,093

PROCESS FOR PRODUCING BARIUM SULFATE WITH REACTIVE SURFACE

Clemens Aderhold, Krefeld, and Hans-Joachim Röhrborn, Neukirchen-Vluyn, both of Fed. Rep. of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed May 27, 1988, Ser. No. 199,982

Claims priority, application Fed. Rep. of Germany, May 30, 1987, 3718277

Int. Cl.[4] C01F 5/42, 11/46; C08K 3/24

U.S. Cl. 106—461 8 Claims

1. A process for producing a barium sulfate pigment having a chemically reactive halogen, hydroxyl, amino, imino, mercapto or terminal olefinic functional group bonded to its surface, said functional group capable of effecting a covalent interaction between said pigment and an organic resin, which comprises the steps of:

(a) coprecipitating barium sulfate and a poorly soluble bar-

ium salt of an additional anion by providing barium ions in the presence of sulfate ions in an aqueous medium containing said additional anion in the form of a water-soluble organic salt or compound selected form the group consisting of alkali metal alkyl or aryl sulfonates, alkali metal alkyl or aryl sulfates, and alkyl or aryl phosphoric acid esters, wherein said alkyl or aryl groups are unsubstituted or substituted by halogen, hydroxyl, amino, imino or mercapto, or contain a terminal olefinic functional group, said additional anion being corprecipitable with barium ions to form said poorly water-soluble barium salt;

(b) recovering the resulting corpreciate from the aqueous medium; and

(c) drying the coprecipitate and afterwards treating the corprecipitate with a silane or siloxane.

4,894,094

DISAZO COMPOUNDS AND FORMULATIONS CONTAINING SAME

Wolfgang Ruff, Stuttgart; Egon Liedek, Esslingen; Gerhard Berger, Stuttgart, and Hans W. Sonneborn, Schwaebisch Gmuend, all of Fed. Rep. of Germany, assignors to Basf Lacke & Farben Aktiengesellschaft, Muenster, Fed. Rep. of Germany

Filed Aug. 19, 1987, Ser. No. 86,780

Claims priority, application Fed. Rep. of Germany, Sep. 5, 1986, 3630278

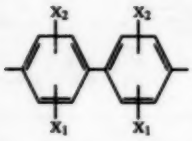
Int. Cl.[4] C09B *35/037*

U.S. Cl. 106—496 **22 Claims**

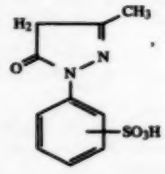
1. A mixture of disazo compounds based on 4,4'-diaminodiphenyl compounds, which contains not less than 50% by weight of a disazo compound of the formula

A—N=N—Z—N=N—B

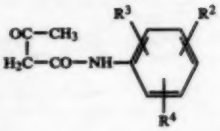
where Z is



where X_1 and X_2 independently of one another are each hydrogen, chlorine, bromine, methoxy or methyl and are arranged symmetrically, A is a radical of a coupling component



where the benzene radical is not further substituted or is additionally monosubstituted or disubstituted by chlorine, methyl or methoxy, and B is a radical of a coupling component



where R^2, R^3 and R^4 independently of one another are each hydrogen, methyl, methoxy or chlorine.

4,894,095

METHOD FOR WASHING AND RINSING OF USED LITHOGRAPHIC PLATE MEMBERS

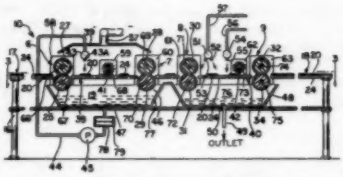
Gary L. Schramm, Brookfield; Ralph G. Postillo, New Berlin, and Richard J. Hladilek, West Allis, both of Wis., assignors to Law Offices of Dick and Harris, Chicago, Ill.

Division of Ser. No. 738,468, May 28, 1985, Pat. No. 4,733,422.

This application Jan. 5, 1988, Ser. No. 141,483

Int. Cl.[4] B08B *3/08, 3/10*

U.S. Cl. 134—2 **26 Claims**



1. A method for cleaning, storing and unsealing at least one lithographic plate member having pre-formed peripheral flanges and ink residue and other contaminants on its surface, comprising the steps of:

removing at least one plate member from the press plate drum;

placing said plate member on feed fixture means;

longitudinally propelling said plate member by drive means;

applying at least one cleaning solvent to said surface of said plate member;

scrubbing said surface of said plate member;

rinsing said surface of said plate member with at least one rinse liquid;

scrubbing further said surface of said plate member;

removing of excess rinse liquid from said surface of said plate member;

sealing said surface of said plate member with a water soluble preserving substance so as to reduce the moisture sensitivity of said plate member after applying at least one cleaning solvent to said surface of said plate member, scrubbing said surface, rinsing said surface, scrubbing further said surface and removing of excess rinse liquid from said surface,

said water soluble substance enabling removal of said substance during a subsequent press run from the press's own water train;

receiving said plate member from removal fixture means; and

storing said plate member until reuse thereof.

4,894,096

PRODUCTS BASED ON ALUMINUM CONTAINING LITHIUM WHICH CAN BE USED IN THEIR RECRYSTALLIZED STATE AND A PROCESS FOR OBTAINING THEM

Philippe Meyer, Voiron, France, assignor to Cegedur Pechiney, Voreppe, France

Filed Jun. 23, 1986, Ser. No. 877,178

Claims priority, application France, Jun. 25, 1985, 85 10031

Int. Cl.[4] C22F 1/04

U.S. Cl. 148—2 **6 Claims**

1. In a method for producing a recrystallized alloy based on Al, consisting essentially of, by weight, 1 to 3.5% Li, up to 4% Cu, up to 5%, up to 3% Zn and additions of Mn, Cr and/or Zr, and comprising the steps of casting, hot working, placing in solution, quenching, and tempering, the improvement comprising forming said alloy from:

Zr≦0.10%

Mn≦0.8%

Cr≦0.20%

$$\text{with } \frac{\%Zr}{0.03} + \frac{\%Mn}{0.3} + \frac{\%Cr}{0.07} > 1.$$

and carrying out the tempering at temperatures (T) less than 190° C. and in a region of less than or equal to the isothermal tempering temperature (T_M) giving rise to maximum hardness, the period during which the isotherm t(T) is maintained at (T) being less than the period during which the isotherm tm(T) is maintained, which brings about the maximum hardness at said temperature (T).

4,894,097

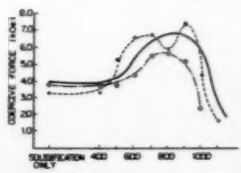
RARE EARTH TYPE MAGNET AND A METHOD FOR PRODUCING THE SAME

Kenzaburou Iijima; Masayuki Takamura, and Takeo Sata, all of Hamamatsu, Japan, assignors to Yamaha Corporation, Shizuoka, Japan

Division of Ser. No. 694,336, Jan. 24, 1985. This application Dec. 31, 1987, Ser. No. 140,296

Int. Cl.[4] H01F 1/02

U.S. Cl. 148—101 **11 Claims**



5. A method for producing improved rare earth type magnet comprising the steps of

preparing molten alloy containing Fe, Gd, Nd and two or more metalloid elements chosen from a group consisting of B, Si and P, at an atomic ratio defined by $(Fe_{1-x}M_x)_y(Gd_zNd_{1-z})_{1-y}$ wherein x is in a range from 0.05 to 0.4, y is in a range from 0.7 to 0.95, z is in a range from 0.05 to 0.8 and M is the total of said two or more metalloid elements

subjecting said molten alloy to solidification by cooling to produce solidified alloy,

subjecting said solidified alloy to pulverization to produce pulverized alloy,

further subjecting said pulverized alloy to compaction in a magnetic field to produce shaped alloy, and

further subjecting said shaped alloy to hot hydraulic compaction to produce a magnet having a coercive force of at least 7.3 KOe and a magnetic susceptibility of at least 40.3 emu/g.

4,894,098

PROCESS FOR PREPARING MAGNETIC LAYER AND MAGNETIC HEAD PREPARED USING THE SAME

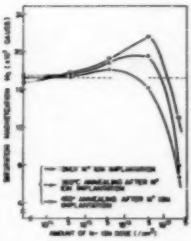
Shigekazu Otomo, Sayama; Noriyuki Kumasaka, Ome; Ryo Imura, Tokorozawa; Ryo Suzuki, Hachioji, and Yutaka Sugita, Tokorozawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Division of Ser. No. 768,965, Aug. 23, 1985, Pat. No. 4,772,976. This application Jul. 28, 1988, Ser. No. 225,368

Claims priority, application Japan, Aug. 27, 1984, 59-176856; Dec. 14, 1984, 59-262777

Int. Cl.[4] G11B 5/845

U.S. Cl. 148—122 **18 Claims**



1. A process for preparing a magnetic layer comprising the steps of implanting ions into the surface region of a thin transition element-based magnetic film, and annealing said film to form an ion-diffused layer to thereby control the composition of said surface region for forming a desired magnetic compound layer.

4,894,099

METHOD FOR INFLUENCING THE INTERNAL STRESS STATE OF SOLID RAILROAD WHEELS

Werner Mombrei; Peter Ottlinger; Klaus Wüchter, all of Dresden; Walter Rode, Halle, and Günter Schulz, Delitzsch, all of German Democratic Rep., assignors to Ministerium fuer Verkehrswesen, Berlin, German Democratic Rep.

Filed Aug. 3, 1988, Ser. No. 227,956

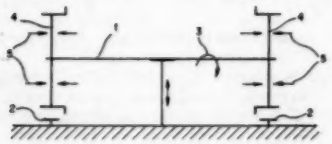
Claims priority, application German Democratic Rep., Sep. 29, 1987, 307372

Int. Cl.[4] C21D 9/32

U.S. Cl. 148—146 **5 Claims**

1. A method for relieving the active internal stress state in the wheel rim of solid railroad wheels caused by thermal stresses, comprising homogeneously heating a wheel center of a solid railroad wheel having a wheel rim, a hub and therebetween a wheel center, individually or in a wheel set, over its circumference until a plastic deformation occurs in an area including an area of maximum internal stress, the temperature

of the wheel rim being less than the temperature of the heated wheel center and not exceeding 300 deg. C. and the temperature difference between the heated region of the wheel center and the wheel rim being at least 100 deg. C.

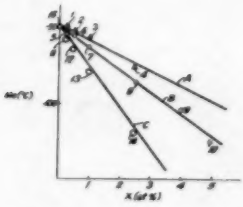


4,894,100

TI-NI-V SHAPE MEMORY ALLOY

Kiyoshi Yamauchi; Shoichi Sato, and Hideo Takaara, all of Miyagi, Japan, assignors to Tokin Corporation, Miyagi, Japan

Filed Jan. 7, 1988, Ser. No. 142,672
Claims priority, application Japan, Jan. 8, 1987, 62-2089
Int. Cl.[4] C22C *19/00*
U.S. Cl. 148—402 **11 Claims**



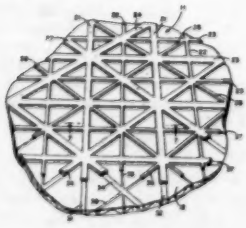
1. A shape memory alloy having a good workability and a reduced temperature difference between a martensitic transition start point and an austenitic transition finish point, which consists of V 0.25–2.0 at %, Ti 48.5 at % or more, and the balance Ni, the atomic ratio of Ni/Ti being 0.96–1.06, said nickel excluding 50 at %.

4,894,101

METHOD OF MAKING PROTECTION COVER

Terrance W. Sachetti, 5930 W. Broadway, Crystal, Minn. 55428

Division of Ser. No. 934,462, Nov. 24, 1986, Pat. No. 4,759,090. This application Jul. 25, 1988, Ser. No. 223,424
Int. Cl.[4] B44C *1/28*
U.S. Cl. 156—67 **32 Claims**



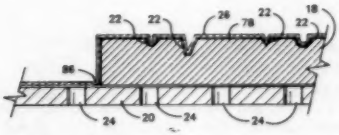
1. A method of making a cover having a surface provided with a light emitting protection grid comprising: providing a fabric having color means and a size and shape of the cover, bleaching the fabric along bands that depict the the grid of the cover to remove color means from the fabric along said bands, appling continuous ribbons of phosphorescent material to the fabric along the bands to cover the bands with phosphorescent material and curing the phosphorescent material and anchoring the phosphorescent material to the fabric whereby the phosphorescent material becomes permanently affixed to the fabric and provides a protection grid that emits light when subjected to light and subsequently located in a dark environment.

4,894,102

METHOD FOR REFINISHING BUILDING PANELS

Kenneth F. Halls, 6972 W. 76th Ave., Arvada, Colo. 80003, and Donald W. Harrison, Golden, Colo., assignors to Kenneth F. Halls, Arvada, Colo.

Continuation of Ser. No. 19,932, Feb. 27, 1987, which is a continuation-in-part of Ser. No. 707,908, Mar. 4, 1985, Pat. No. 4,666,540. This application Dec. 5, 1988, Ser. No. 282,954
Int. Cl.[4] B32B *35/00*
U.S. Cl. 156—94 **5 Claims**



1. A method of refinishing a building panel, such as a ceiling panel or tile and the like, having a worn or discolored decorative front surface, a back surface and side edges forming a periphery, said method comprising the steps of:

placing the building panel on a vacuum support surface having a plurality of perforations through which air can be drawn to form a partial vacuum, said building panel being placed so that its back surface is in contact with the perforated support surface and its decorative surface is exposed, said building panel being positioned on the perforated support surface so that its periphery is surrounded by exposed uncovered perforations;

applying adhesive to one of the decorative surfaces of the building panel and a side of an air impervious sheet;

placing the sheet over the decorative surface of the building panel with the adhesive therebetween, which sheet has a peripheral edge extending over the exposed perforations in the vacuum support surface around the periphery of the panel to form a vacuum chamber;

leaving the peripheral edge of the sheet completely unrestrained; and

drawing a partial vacuum via the perforations in the vacuum chamber formed between the sheet and the perforated support surface ;sufficient to hold the unrestrained peripheral edge of the sheet in sealing engagement with the support surface to create a partial vacuum across the entire decorative surface of the building panel which enables ambient air pressure to force or collapse the sheet tightly against the decorative surface and allows the unrestrained peripheral edge to be drawn up so that the sheet substantially assumes the contour or texture of the decorative surface and is adhered thereto by the adhesive.

4,894,103

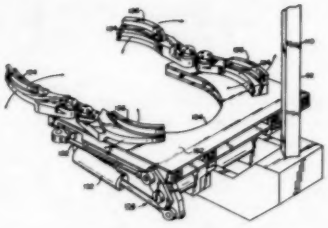
ROBOT FOR TIRE BUILDING MACHINE AND METHOD OF OPERATION

David W. Bailey, Waterloo, Canada, assignor to The Uniroyal Goodrich Tire Company, Akron, Ohio

Filed May 26, 1988, Ser. No. 199,080

Int. Cl.[4] B29D *30/20*

U.S. Cl. 156—111 **6 Claims**



1. A method of transporting a cylindrical tire carcass and a cylindrical green tire between various processing locations comprising:

providing a robot having a pair of pivotally supported arms with contoured free ends movable toward and away from each other, the arms having first interior surfaces of a size and shape to thereby grasp the exterior cylindrical surface of a carcass when the arms are moved toward each other, the arms also having second exterior surfaces of a size and shape to thereby grasp the interior cylindrical surface of a green tire when the arms are moved away from each other;

moving the robot between a pick up location, a tire building machine, and an inspection location;

closing the arms by pivotal movement toward each other at the pick up location to grasp the exterior cylindrical surface of a carcass with first surfaces and then transporting the grasped carcass to the tire building machine through the moving of the robot; and

opening the arms by pivotal movement away from each other at the tire building machine to grasp the interior cylindrical surface of a green tire with second surfaces and then transporting the grasped green tire to the inspection location by the moving of the robot.

4,894,104

METHOD AND APPARATUS FOR SEALING CARTONS

David S. Hemus, Cirencester, England, assignor to MB Group plc, Reading, England

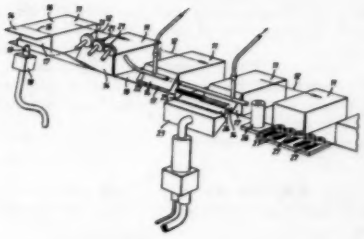
Filed Nov. 29, 1988, Ser. No. 277,265

Claims priority, application United Kingdom, Dec. 17, 1987, 8729478

Int. Cl.[4] B32B *31/20*

U.S. Cl. 156—152 **12 Claims**

1. A method of sealing a carton by sticking together facing surfaces of a hinged flap and a wall of the carton using a solvent-based adhesive, wherein a deposit of the adhesive is applied to one of the surfaces, the two surfaces are then brought together to transfer some of the adhesive to the other of the surfaces and to thin out and spread the deposit of adhesive on the first-mentioned surface, the surfaces are separated so as to lie at an acute angle to one another, hot air is directed on to the



surfaces to effect partial drying of the adhesive, and the surfaces are then pressed together to stick them to one another.

4,894,105

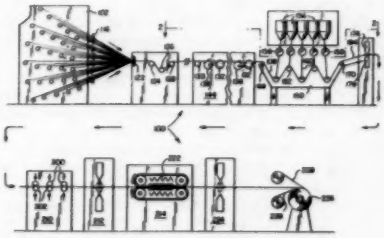
PRODUCTION OF IMPROVED PREIMPREGNATED MATERIAL COMPRISING A PARTICULATE THERMOPLASTIC POLYMER SUITABLE FOR USE IN THE FORMATION OF SUBSTANTIALLY VOID-FREE FIBER-REINFORCED COMPOSITE ARTICLE

Robert Dyksterhouse, and Joel Dyksterhouse, both of Marathon, Fla., assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 928,917, Nov. 7, 1986, abandoned. This application Nov. 4, 1987, Ser. No. 114,362

Int. Cl.[4] B29B *15/12*; **C08J** *5/00*; **B29C** *67/14*

U.S. Cl. 156—181 **161 Claims**



1. A method for the production of an improved fibrous material suitable for the formation of a substantially void-free composite article comprising a plurality of adjoining substantially parallel reinforcing filaments in association with a matrix-forming thermoplastic polymer comprising:

(a) preparing a dispersion of solid particles of a thermoplastic polymer in an aqueous medium which contains an effective amount of a dissolved polymeric binding agent,

(b) substantially increasing the viscosity of said dispersion to form an improved impregnation bath whereby the viscosity of the resulting bath becomes at least 50,000 cps. and said impregnation bath has a plastic flow characteristic with shear-thinning behavior which is sufficient to substantially uniformly suspend said particulate thermoplastic polymer within said bath,

(c) impregnating said adjoining substantially parallel reinforcing filaments with said bath under conditions wherein said bath is caused to flow between said adjoining filaments by the application of work wherein said bath flow inherently results in a reduction of the viscosity of said bath which aids in the incorporation of said particulate thermoplastic polymer between adjoining filaments, and

(d) controlling the content of said aqueous medium in the resulting fibrous material to provide a product having said particles of matrix-forming thermoplastic polymer substantially uniformly dispersed between adjoining filaments in the absence of fusion bonding which inherently (1) is drapable and tacky at ambient conditions, (2) is handleable without segregation of said particles within the fibrous material, and (3) which upon the application of heat and pressure can be transformed into a substantially void-free fiber-reinforced composite article of a predetermined configuration wherein said solid particles form the matrix phase.

4,894,106

METHOD FOR MANUFACTURE OF LABELS

David J. Instance, Guinea Hall, Sellindge, Kent, United Kingdom

Filed Jan. 13, 1987, Ser. No. 2,810
Claims priority, application United Kingdom, Jan. 24, 1986, 8601695
Int. Cl.[4] B32B 31/18
U.S. Cl. 156—227 7 Claims

1. A method of producing labels, the method comprising the steps of:

(a) providing an elongate support web;

(b) disposing a succession of individual discrete folded printed sheets in a row along the length of the support web;

(c) covering the succession of sheets on the support web with a web of a self-adhesive laminar material which is adhered by the self-adhesive surface thereof over the succession of sheets and the support web;

(d) cutting through the laminar material and through the support web so as to form a succession of multiple labels each of which has a respective one of the sheets adhered to the support web by the laminar material; and

(e) cutting, either before, after or simultaneously with cutting step (d), at least one cut through the laminar material, through the respective sheet and through the support web of each of the multiple labels so as to divide each multiple label into at least two labels, each of which has a respective portion of the respective sheet which is adhered to a respective portion of the support web by a respective portion of the laminar material.

4,894,107

PROCESS FOR MAKING MULTIPLE LAYER POLYMERIC FILMS

Samuel W. Tse, Appleton; Almar T. Widiger, Neenah, and Keith D. Lind, Appleton, all of Wis., assignors to American National Can Company, Greenwich, Conn.

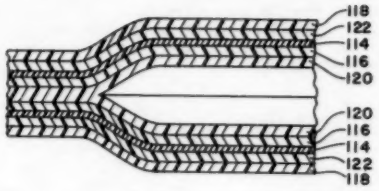
Filed May 16, 1985, Ser. No. 735,082
Int. Cl.[4] B32B 31/30
U.S. Cl. 156—229 25 Claims

1. A process for making a multiple layer molecularly oriented film, said process comprising the steps of:

(a) forming a multiple layer film having first and second layers whose compositions comprise at least 10% by weight ethylene vinyl acetate copolymer and a third layer of vinylidene chloride copolymer disposed between said first and second layers;

(b) heating said multiple layer film to an elevated temperature appropriate for molecular orientation, and molecularly orienting said multiple layer film; and

(c) after said orienting of said multiple layer film, subjecting said multiple layer film, containing said first, second, and third layers, to irradiation in an amount of at least 1.5



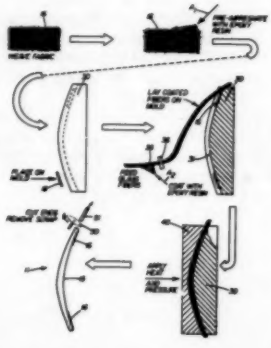
megarads, said irradiation after said orienting comprising an initial irradiation exposure for each of said first, second, and third layers.

4,894,108

METHOD OF FORMING A COMPOSITE LEAF SPRING WITH FABRIC WEAR PAD

David S. Richard, Dayton; John E. Mutzner, Covington; John F. Ellerman, and Thomas E. Rau, both of Dayton, all of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Oct. 17, 1988, Ser. No. 258,757
Int. Cl.[4] B29C 43/02
U.S. Cl. 156—245 2 Claims



1. A method of forming a composite leaf spring for a vehicle suspension system in a mold with a contour corresponding to the spring comprising:

coating elongated fibers with adhesive;

selecting a fabric pad of synthetic fibers woven in a double plane weave with about 70–90 picks/inch in the warp direction and about 10–14 picks/inch in the fill direction;

applying the pad in a location in the mold to form an end of the spring with the pad arranged so that the warp direction extends longitudinally of the spring;

laying the coated fibers in layers in the mold over the pad; and

applying heat and pressure to the coated fiber layers to form and cure the spring and to integrally bond the pad to the spring;

whereby the spring is formed with a wear surface at the end.

4,894,109

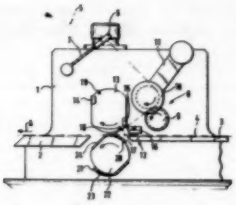
METHOD AND APPARATUS FOR TACKING TOGETHER THE COPIES OF MULTICOPY FORMS

Bodo Brehme, Gumbertstrasse 133, D-4000 Duesseldorf, Fed. Rep. of Germany

Filed May 25, 1988, Ser. No. 227,690

Int. Cl.[4] B32B *31/18*

U.S. Cl. 156—256 **16 Claims**



1. The method of tacking together multipage forms having pin feed holes, comprising the steps of:

(a) providing a multipage form;

(b) providing a supply of adhesive tacking tape;

(c) longitudinally advancing the form;

(d) advancing a length of the tape parallel to the direction in which the form advances;

(e) severing the tape with rotary cutter means so that the severed length is deposited on the form overlying one of the pin feed holes;

(f) advancing the form through compression means and thereby causing the deposited tape to be tacked on the form;

(g) pushing a portion of the severed tape through the associated pin feed hole; and,

(h) folding back the tape portion extending through the pin feed hole for causing the portion to engage the opposite side of the form.

4,894,110

IDENTIFICATION CARD WITH A VISIBLE AUTHENTICITY FEATURE

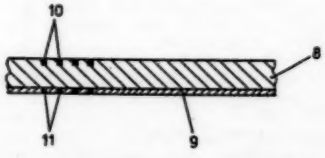
Joseph Lass; Hansjürgen Merkle, both of Munich; Wolfgang Becker, Neubiberg; Werner Herget, and Erwin Lob, both of Munich, all of Fed. Rep. of Germany, assignors to GAO Gesellschaft fur Automation und Organisation mbH, Munich, Fed. Rep. of Germany

Division of Ser. No. 919,006, Oct. 15, 1986, Pat. No. 4,766,026. This application Jun. 29, 1988, Ser. No. 213,253

Claims priority, application Fed. Rep. of Germany, Oct. 15, 1985, 3536740

Int. Cl.[4] B29C *71/04*; B29D *9/00*

U.S. Cl. 156—272.8 **12 Claims**



1. A method for manufacturing an identification card containing a plurality of synthetic layers in which information is provided by means of a laser beam, said information being visible as changes in the optical properties of the synthetic layers due to irreversible changes in the material caused by the laser beam, characterized in that

the individual layers are joined together to form a card compound, at least a first and a second synthetic layer having transparent areas which overlap,

the first layer and the second layer have a property of changing visibly when exposed to the laser beam, this change being effected only as of certain intensity values, a particular intensity value required herefor being lower for the first layer than for the second layer,

the card compound is oriented toward the laser in such a way that the second layer comes to lie on a side facing the laser,

at least parts of the information are provided with an intensity which causes visible changes of material to occur simultaneously in the first and second layers, and

first and second pieces of information are provided in such a way as to be visible overlapping at a first viewing angle and singly at a second viewing angle, the appearance of the pieces of information changing in accordance with the viewing angle.

4,894,111

PLUG PART FOR RELEASABLE PLUG-TYPE CONNECTIONS OF EIGHT WAVEGUIDE

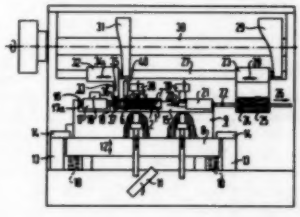
Dieter Krause; Josef Sedlmaier, and Norbert Odenar, all of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Apr. 22, 1986, Ser. No. 856,433

Claims priority, application Fed. Rep. of Germany, Mar. 25, 1983, 3310973

Int. Cl.[4] B32B *31/06*

U.S. Cl. 156—294 **8 Claims**



1. A method of manufacturing a plug part for releasable plug-type connections of light waveguides comprising:

a capillary tube having a hollow interior with acceptance openings at each end for the acceptance of a light waveguide,

a hollow plug body in which said capillary tube is inserted such that its hollow interior is coaxially aligned relative to the outside circumference of said plug body, and

a hardenable bonding agent for securing said capillary tube in said plug body, wherein said hardenable bonding agent is introduced into an annular gap formed between the outside circumference of said capillary tube and the inside circumference of said plug body, comprising the following steps:

(a) loosely introducing the capillary into the plug body,

(b) engaging the capillary between two centering means,

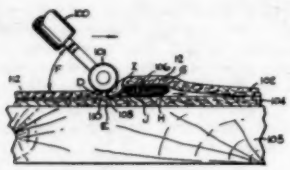
(c) coaxially aligning the acceptance opening of the capillary relative to the outside circumference of the plug body with the assistance of the centering means, and

(d) fixing the capillary in the plug body by means of curing a hardenable bonding agent introduced into the annular gap.

4,894,112
METHOD AND APPARATUS FOR JOINING OVERLAPPING SHEETS OF THERMALLY SEALABLE MATERIAL

Glenn W. Lippman, 169 S. Buchanan Ave., Louisville, Colo. 80027-9505

Filed Nov. 13, 1987, Ser. No. 120,117
Int. Cl.[4] B32B *31/26, 31/00*
U.S. Cl. 156—308.4 16 Claims



1. A hand-held apparatus for joining overlapping sheets of thermally sealable material together, said apparatus comprising:

a handroller having a handle and a roller; and

a hand held heating means having a handle and a heating body for heating opposing surfaces of the overlapping sheets when said heating body is positioned between and in contact with the opposing surfaces of the sheets and against an upstream face of a moving compressed portion of the sheets, the moving compressed portion being compressed and moved along the overlapping sheets by an individual pressing downwardly on the sheets with the handroller, the sheets thereby being pressed together when they are engulfed by the moving compressed portion, said heating body defining generally parallel top and bottom surfaces and two generally parallel rounded sides, said rounded sides being sized and configured to serve as an abutment for the roller of the handroller so that the roller moves the heated body sin unison with the roller as the roller is moved along the edge of the sheets with one of said rounded sides positioned against the upstream face of the moving compressed portion, said bottom surface of said rounded sides also being sized and configured to heat the opposing surfaces of the sheets as such movement in unison takes place so that the surfaces liquify to form a liquified interfacial region between the sheets when the sheets are pressed together as they are engulfed by the moving compressed portion, the liquified interfacial region joining the sheets when it cools, each of said rounded sides also being tapered and extending from a back edge to a front portion of said heating body, said back edge being rigidly attached to said handle, said front portion being generally wedge shaped so as to taper to a rounded front edge which adjoins each of said rounded sides and which terminates along an arcuate path lying in a plane which is parallel to said top and bottom surfaces, said rounded front edge facilitating insertion of said body between the sheets.

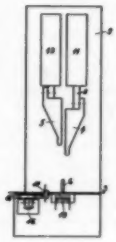
4,894,113
APPARATUS FOR MANUFACTURING A CORRUGATED MEMBER

Otto J. Hofer, Im Gafos 8, 9494 Schaan, Liechtenstein

Continuation of Ser. No. 6,329, Jan. 14, 1987, abandoned, which is a continuation of Ser. No. 456,445, Jan. 17, 1983, abandoned.
This application Jun. 21, 1988, Ser. No. 211,088
Claims priority, application Switzerland, Jan. 13, 1982, 175/82
Int. Cl.[4] B31F *1/20*
U.S. Cl. 156—462 13 Claims

1. In an apparatus for manufacturing a corrugated member having a carrier web with a top web arranged thereon in a corrugated configuration, wherein the top web is joined to the carrier web in the region of the respective depressions which extend transversely with respect to the direction of the web, said apparatus comprising a shaping station having a deformation table on which the carrier web can be transported forward with a stepping motion in the longitudinal direction by means of a feed arrangement, feed means for feeding the top web over the carrier web, shaping means above the top web, which shaping means has at least two pressing means that can be pressed against the top web and the deformation table, and at least one drive and control means for cyclic advance of the feed arrangement and for cyclic displacement of the pressing means into the deformation position, wherein the improvement comprises;

a deformation element at the shaping station arranged laterally and displaceable relative to the corrugations to be produced and cyclically displaceable by said drive and control means such that it can be laterally inserted between the top web and the carrier web to shape a corrugation portion and, after the shaping operation, can be laterally retracted again from the closed corrugation portion;



said at least two pressing means include a first pressing means arranged downstream of the deformation element and a second pressing means arranged upstream of the deformation element relative to the feed direction, and wherein the first and second pressing means can by actuated independently of one another; and

said drive and control means comprise means for first laterally inserting said deformation element, then pressing said first pressing means against the top web, then pressing said second pressing means against said top web, then raising said first pressing means and laterally withdrawing said deformation element, and then raising said second pressing means, advancing the carrier web in its stepping motion, and repeat the cycle.

4,894,114
PROCESS FOR PRODUCING VIAS IN SEMICONDUCTOR

Harvey C. Nathanson, Pittsburgh; Michael C. Driver, McKeesport; Michael W. Cresswell, Plum Borough, all of Pa.; Ronald G. Freitag, Baltimore, Md.; Donald K. Alexander, and Daniel F. Yaw, both of Ellicott City, Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Division of Ser. No. 13,490, Feb. 11, 1987, Pat. No. 4,823,136.
This application Jan. 3, 1989, Ser. No. 292,973
Int. Cl.[4] H01L *21/306;* B44C *1/22;* C03C *15/00, 25/06*
U.S. Cl. 156—631 1 Claim

1. A metal evaporation method of producing vias within a semiconductor substrate, said vias operable to facilitate the transmission of electrical signals from the bottom surface of said semiconductor substrate to the top surface of said semiconductor substrate, said method comprising:

thinning of a wafer of semiconductor material, said wafer having a top and a bottom surface to a thickness of approximately 100 microns;

mounting of said thinned wafer of semiconductor material

face down upon a wafer holder such that said top surface of said wafer is mounted upon said wafer holder using an adhesive means;

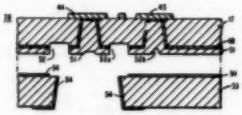
application of a first layer of photoresist material upon said bottom surface of said wafer;

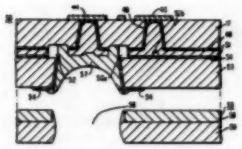
patterning of said first layer of photoresist, said patterning operable to define the holes through said semiconductor substrate for said vias to be etched;

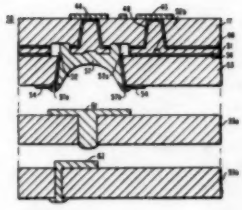
formation of said vias within said semiconductor substrate utilizing an etching technique;

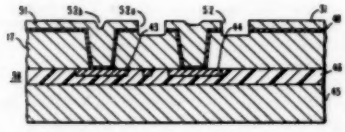
selective removal of said first layer of photoresist material from said bottom surface of said wafer;

sputtering of metal over said bottom surface of said semiconductor wafer, thereby forming a metallization layer upon said bottom surface of said semiconductor wafer;









application of a second layer of photoresist material upon said metallization layer upon said bottom surface of said semiconductor wafer, said second layer of photoresist selectively patterned about said vias;

application of a thin layer of a highly conductive metal upon the surface of said second layer of photoresist;

selective removal of said second layer of photoresist material such that said sputtered metal layer is selectively exposed;

light etching of said semiconductor wafer to insure its insulating properties and to clean said bottom surface;

demounting of said wafer from said wafer holder means;

removal of said adhesive means from said top surface of said wafer;

application of a heat sink means, said heat sink means comprising semi-insulating material having good thermal conductive properties and an expansion coefficient closely matched to said wafer, said heat sink means applied to said bottom side of said wafer;

placement of a metal shadow mask upon said wafer such that an orifice in said mask is placed directly over said via; and

evaporation of metal into the orifice in said metal shadow mask and said via, said evaporation of metal operable to form solid electrical connections through said semiconductor substrate, said solid electrical connections operable to interconnect said top and said bottom surfaces, electrically.

4,894,115

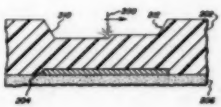
LASER BEAM SCANNING METHOD FOR FORMING VIA HOLES IN POLYMER MATERIALS

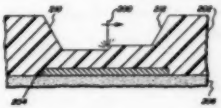
Charles W. Eichelberger, Schenectady; Robert J. Wojnarowski, Ballston Lake, and Kenneth B. Welles, II, Scotia, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Feb. 14, 1989, Ser. No. 310,149

Int. Cl.[4] B44C 1/22; B29C 37/00; C03C 15/00, 25/06

U.S. Cl. 156—643 **27 Claims**





1. A method for producing via holes in a polymer dielectric layer comprising the steps of:

scanning a predetermined area of the polymer dielectric layer with a laser beam in a predetermined pattern at a sufficient level of energy and speed to heat a small volume of the polymer dielectric to a point of vaporization during a predetermined laser beam dwell time, said volume being the product of the laser beam maximum energy spot area and the depth of a surface layer portion of the polymer dielectric layer; and

repeating said scanning of said area for a sufficient number of times to etch a desired amount of polymer dielectric layer from said predetermined area.

4,894,116

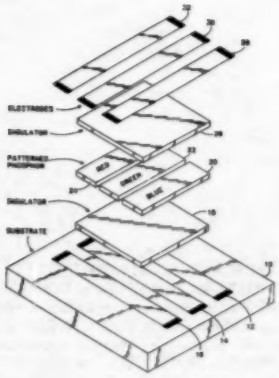
PHOSPHOR ONLY ETCHING PROCESS FOR TFEL PANEL HAVING MULTIPLE-COLORED DISPLAY

William A. Barrow, Aloha; Richard T. Tuenge, Hillsboro, and Hal Merritt, Aloha, all of Oreg., assignors to Planar Systems, Inc., Oreg.

Continuation-in-part of Ser. No. 161,283, Feb. 29, 1988, abandoned, which is a division of Ser. No. 58,658, May 20, 1987, abandoned, which is a continuation-in-part of Ser. No. 844,614, Mar. 27, 1986, abandoned. This application Jan. 13, 1989, Ser. No. 296,608

Int. Cl.[4] B44C *1/22*; C03C *15/00, 25/06*

U.S. Cl. 156—643 **7 Claims**



1. A method of constructing a multicolored TFEL display screen comprising the steps of:

(a) depositing on a substrate a first set of elongate transparent electrodes;

(b) depositing an insulating layer on top of said electrodes;

(c) depositing over said insulating layer a first thin film comprising a first color-producing phosphor;

(d) etching said first thin film to leave stripes of said first color-producing phosphor extending perpendicular to said transparent electrodes;

(e) depositing an etch stop layer on top of said stripes of said first thin film;

(f) depositing a second thin film comprising a second color-producing phosphor on top of said etch stop layer;

(g) etching said second thin film to leave stripes of a second color-producing phosphor lying adjacent to and extending parallel to said stripes of said first color-producing phosphor; and

(h) depositing an insulating layer and a second set of elongate electrodes over said first and second stripes to extend colinearly therewith.

4,894,117

PROCESS FOR MANUFACTURING HIGH BULK DENSITY PARTICULATE FABRIC SOFTENING SYNTHETIC ANIONIC ORGANIC DETERGENT COMPOSITIONS

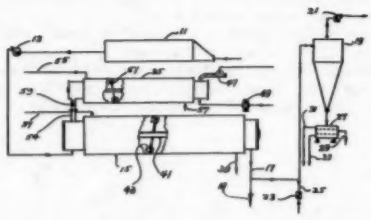
Antonio Bianchi, and Gualtiero Barletta, both of Rome, Italy, assignors to Colgate-Palmolive Company, Piscataway, N.J.

Filed Apr. 28, 1988, Ser. No. 187,103

Int. Cl.[4] B01D *1/14, 1/24*; C11D *1/12*

U.S. Cl. 159—49 **8 Claims**

1. A process for manufacturing a high bulk density particulate detergent composition, suitable for mixing with high bulk density particulate builder compositions for such detergent to make built high bulk density particulate laundry detergent compositions, which comprises turbodrying, which is drying a dryable mix while repeatedly subjecting it and any particles resulting from such turbodrying to centrifugal and axial forces, which create thin films of the mixture, which are pulled apart during such turbodrying, in a turbodrying zone where turbodrying takes place, a mixture of synthetic organic detergent, water insoluble powdered carrier for such detergent, and aqueous medium for such detergent and carrier, in which the



ratio of detergent: carrier weights is in the range of 1:1 to 1:4 and the proportion of water present is 20 to 50%, to convert such mixture to high bulk density agglomerate particles, which particles comprise detergent, carrier and less water than the mixture, which particles are subjected to further such turbodrying and are converted thereby to high bulk density particles of substantially globular shape.

4,894,118

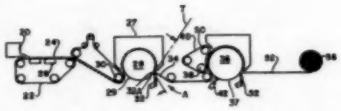
RECREPED ABSORBENT PRODUCTS AND METHOD OF MANUFACTURE

Steven L. Edwards, Fremont, and William D. Lloyd, Neenah, both of Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Continuation-in-part of Ser. No. 755,147, Jul. 15, 1985, abandoned. This application Aug. 6, 1986, Ser. No. 894,371

Int. Cl.[4] D21H *5/24*

U.S. Cl. 162—112 **25 Claims**



1. A method of making a tissue product comprising:

(a) forming a non-layered wet web of cellulosic fibers having a selected basis weight from an aqueous stock slurry comprising secondary fibers;

(b) partially dewatering said web to remove a portion of the water therein, such that interfiber adhesion is enhanced within said web;

(c) conveying said web to a first drying cylinder and affixing said web to said cylinder such that further interfiber adhesion is effected upon further dewatering to a fiber consistency of at least 90%;

(d) creping said web from the first drying cylinder with a doctor blade, such that said interfiber adhesion is disrupted;

(e) conveying said web to a second drying cylinder and affixing said web thereto at the location of a nip formed between the second cylinder and an imprinting fabric having a pattern of raised knuckle areas thereon;

(f) differentially compressing the web to the second cylinder with said imprinting fabric, said compression resulting in adhesion of said web to said cylinder being greatest in discrete points corresponding to the knuckles of said imprinting fabric;

(g) differentially creping the same side of said web from the second cylinder; and

(h) converting said web into a one-ply or two-ply facial tissue or bath tissue product.

4,894,119

RETENTION AND/OR DRAINAGE AND/OR DEWATERING AID

Joseph J. Baron, Jr., Morris Plains; Tamara Nowakowski, Boonton Township, Morris County; Thomas A. Farrington, Sparta, and Frederick R. Mahn, Verona, all of, assignors to Drew Chemical Corporation, Boonton, N.J.

Filed Apr. 10, 1985, Ser. No. 721,876

Int. Cl.[4] D21H *3/38*

U.S. Cl. 162—168.2 **10 Claims**

1. A process for improving the retention and/or drainage in the manufacture of paper, comprising:

adding to a paper pulp stock prior to forming a paper sheet an effective amount consisting essentially of both a non-ionic polymer and a cationic polymer wherein the non-ionic polymer is polyacrylamide and the only cationic polymer added is selected from the group consisting of copolymers of acrylamide and a cationic monomer, diallylamine polymers and polymers of aminoalkyl esters of acrylic and methacrylic acid.

4,894,120

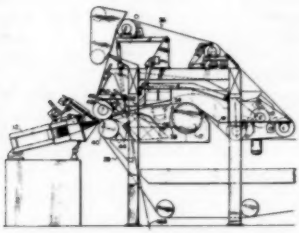
TWIN WIRE FORMING APPARATUS

Merle W. North, Beloit, Wis., assignor to Beloit Corporation, Beloit, Wis.

Continuation of Ser. No. 878,964, Apr. 30, 1986, abandoned. This application Dec. 2, 1987, Ser. No. 127,525

Int. Cl.[4] D21F *1/00*

U.S. Cl. 162—301 **9 Claims**



1. A forming apparatus for forming a web from stock, said apparatus comprising:

a frame;

a first plurality of guide rolls rotatably connected to said frame;

a first continuous forming wire loop extending around, and guided by, said first plurality of rolls;

a second plurality of guide rolls rotatably connected to said frame;

a second continuous forming wire loop extending around, and guided by, said second plurality of rolls;

said first and second wires cooperating together to define therebetween a substantially horizontal forming section in which the web is formed, said forming section having a first and a second end;

a headbox disposed directly adjacent to, and upstream relative to said first end of said forming section such that the stock is ejected from said headbox towards said first end of said forming section so that the stock moves together with, and between, said wires and along said forming section in a direction from said first towards said second end of said forming section, said headbox being structured so that the stock impinges on said first wire prior to said second wire;

a dewatering shoe disposed adjacent to said first end of said forming section and downstream relative to said headbox for dewatering the web, said shoe being connected to a source of partial vacuum;

said dewatering shoe defining a curved surface which abuts against said first wire, said curved surface having a center of curvature disposed on the opposite side of said first wire relative to said second wire such that a first portion of water is removed from the stock through said first wire and said curved surface and a second portion of water is removed from the stock through said second wire due to the centrifugal force of the stock moving along said first wire as said first wire passes over said curved surface;

a vacuum slot disposed adjacent to said second wire for collecting said second portion of water, said vacuum slot being disposed adjacent to said second wire such that said wires are disposed between said vacuum slot and said dewatering shoe, said vacuum slot being connected to a source of partial vacuum;

a radius top suction box disposed downstream relative to said vacuum slot such that said wires are disposed between said vacuum slot and said suction box, said suction box further reducing the moisture content of the formed web by removing water through said first wire, said suction box being connected to a source of partial vacuum;

a roll disposed downstream relative to said suction box between said suction box and said second end of said forming section, said roll being disposed on the same side of said first wire as said dewatering shoe;

said wires wrapping said roll such that a third portion of water is removed from the stock through said second wire;

said roll having a radius of curvature which is less than the radius of curvature of said curved surface, such that when said wires move around and wrap said roll, said third portion of water is removed by centrifugal force from the stock through said second wire so that dewatering of the stock from said first towards said second end of said forming section gradually increases so that the removal of fines from the web is minimized and two-sidedness of the resultant web is inibited; and

said second wire loop being devoid of dewatering elements between said vacuum slot and said roll.

4,894,121

PRESSURE PULP WASHER

Oscar Luthi; Frederick S. Lewis, both of Nashua, and Lawrence A. Carlsmith, Amherst, all of N.H., assignors to Ingersoll-Rand Company, Woodcliff Lake, N.J.

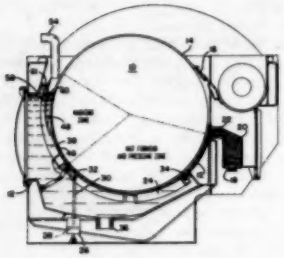
Continuation of Ser. No. 893,988, Aug. 7, 1986, abandoned. This application Aug. 26, 1988, Ser. No. 244,570

Int. Cl.[4] D21C *9/02, 9/06*

U.S. Cl. 162—329 **4 Claims**

1. In an apparatus for forming a pulp mat from a pulp slurry; a vat; a rotatable drum mounted in the vat, said rotatable drum being constructed to permit liquid flow radially into the drum to form a pulp mat on the outside surface of the drum; a mat forming and pressing baffle disposed in spaced circumferential relationship about the periphery of said drum to form a first part of a circumferential space for forming and pressing the mat; a washing baffle disposed in spaced circumferential relationship about the periphery of said drum to form a second part of a circumferential space having its upstream edge circumferentially separated from the downstream edge of the mat forming and pressing baffle to provide a longitudinal slot through which wash water is flowed into the circumferential space separating the washing baffle from the drum, the upstream edge of the washing baffle having a wiper; a valve for controlling the velocity of the flow of liquid through the longitudinal slot, said valve having a surface facing the drum and continuously in contact with the wiper; and means interconnecting

said valve, the mat forming and pressing baffle, and the washing baffle constructed to widen and narrow the slot to move



the washing baffle outwardly and inwardly respectively, when the mat forming and pressing baffle moves outwardly and inwardly respectively.

4,894,122

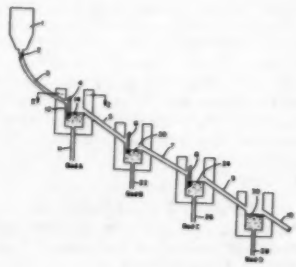
CONTINUOUS PROCESS FOR THE DESULPHURIZATION OF CARBONACEOUS RESIDUALS FROM DISTILLATION OF PETROLEUM USING A PLURALITY OF FLUIDIZED BEDS

Arturo Lazcano-Navarro, Monclova, and Andres Geronimo-Torres, Saltillo, both of Mexico, assignors to Instituto Mexicano de Investigaciones Siderurgicas, Saltillo, Mexico

Continuation-in-part of Ser. No. 64,808, Jun. 22, 1987, abandoned. This application Jan. 17, 1989, Ser. No. 297,524

Int. Cl.[4] C01B *31/02*

U.S. Cl. 201—17 **3 Claims**



1. A continuous process for the desulphurization of particles of undevolatilized petroleum coke having a particle size of from about −20 to about +80 mesh and having an initial sulphur content of over 5% by weight to obtain a final sulphur level of between about 0.9% and about 0.5% by weight, said process comprising: providing four separate fluidized beds that are interconnected in series by individual inclined conduits to provide a first fluidized bed, a second fluidized bed in communication with said first fluidized bed, a third fluidized bed in communication with said second fluidized bed, and a fourth fluidized bed in communication with said third fluidized bed so that the particles of petroleum coke slide by gravity from one fluidized bed to a successive fluidized bed through a respective inclined conduit, each of said first, second and third fluidized beds having a respective particulate material inlet and a respective vertical wall opposite to and spaced from the particulate material inlet for deflecting entering particles of petroleum coke downwardly before the particles of petroleum coke pass into respective electrical heating zones in each of the first three beds; introducing a fluidized gas upwardly through the bottom of each of said four beds, wherein each of said first, second, and third fluidized beds is a heating bed and includes an electrically operated heating zone and said fourth fluidized bed is a cooling bed; introducing undevolatilized particles of petroleum coke into the inlet of said first fluidized bed; deflecting the particles of petroleum coke downwardly into a preliminary heating zone; heating the particles of undevolitilized petroleum coke in the preliminary heating zone between the particulate material inlet and the vertical wall in said first fluidized bed by thermal conduction to a temperature of about 1000° C. to substantially devolatilize the particles of petroleum coke; passing the substantially devolatilized particles of petroleum coke under a lower edge of said vertical wall of said first fluidized bed into the electrical heating zone of said first fluidized bed; maintaining the temperature of the particles of petroleum coke in said first fluidized bed at between about 1500° C. and about 1600° C. for a period of from about 0.5 hour to about 1 hour to reduce the sulphur content of the particles of petroleum coke from over 5% by weight to between about 3% and about 4% by weight; permitting the particles of petroleum coke to slide by gravity from said first fluidized bed to said second fluidized bed through a connecting inclined conduit; deflecting the particles of petroleum coke downwardly by the vertical wall in said second fluidized bed to cause the particles of petroleum coke to gradually enter the electrical heating zone in said second fluidized bed; maintaining the temperature of the particles of petroleum coke in said second fluidized bed at between about 1650° C. and 1700° C. for a period of from about 0.5 hour and about 1 hour to provide particles of petroleum coke having a sulphur content of from about 1.2% to about 1.8% by weight; permitting the particles of petroleum coke to slide by gravity from said second fluidized bed to said third fluidized bed through a connecting inclined conduit; deflecting the particles of petroleum coke downwardly by the vertical wall in said third fluidized bed to cause the particles of petroleum coke to gradually enter the electrical heating zone in said third fluidized bed; maintaining the temperature of the particles of petroleum coke in said third fluidized bed at between about 1950° C. and about 2200° C. for a period of from about 0.5 hour to about 1 hour to provide particles of petroleum coke having a sulphur content of from about 0.9% to about 0.5% by weight; permitting the particles of petroleum coke to slide by gravity from said third fluidized bed to said fourth fluidized bed through a connecting inclined conduit; cooling the particles of petroleum coke within said fourth fluidized bed by introducing fluidizing gas into said fourth fluidized bed and maintaining the particles in fluidized condition within said fourth fluidized bed for a period of from about 0.25 hour to about 0.5 hour; and thereafter passing the cooled particles of petroleum coke through a conduit for storage.

4,894,123

HIGH EFFICIENCY WATER DISTILLER

Arthur R. Helmich, Rte. 5, Box 5150, Benton, Ark. 72015-9525

Filed Nov. 1, 1988, Ser. No. 265,587

Int. Cl.[4] B01D *3/02*

U.S. Cl. 202—176 **19 Claims**

1. A distillation apparatus for removing contaminants from water, the apparatus comprising:

an outer enclosure including an incoming water inlet port and a condensed water outlet port;

a preheat unit including (a) a steam receiving bowl for receiving steam from the evaporator unit, and (b) an incoming water bowl within the steam receiving bowl for removing heat from the steam to preheat water to the evaporator unit;

a water inlet conduit for passing incoming water from the inlet port to the incoming water bowl;

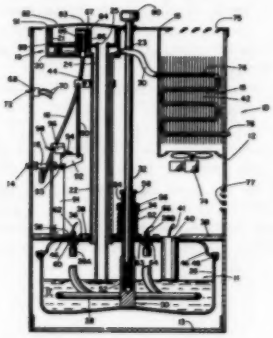
a valve for controlling the flow of incoming water through the water inlet conduit;

an evaporation unit for heating incoming water with contaminants to generate steam, the evaporation unit including (a) a heating bowl disposed within the enclosure for housing the incoming water, (b) an electrical heating

element positioned within the heating bowl, and (c) a first cover affixed within the enclosure and over the heating bowl;

a substantially vertical steam chimney extending from the heating bowl, through the cover, and to the steam receiving bowl;

a substantially vertical water chimney positioned within the vertical steam chimney for passing water from the incoming water bowl to the heating bowl while removing heat from the steam in the vertical steam chimney to heat the water passing through the water chimney; and



a condenser unit for cooling the steam to form condensate water, the condenser unit comprising a fin-and-tube heat exchanger including (a) at least one tube in fluid communication at one end with the steam receiving bowl and in fluid communication at the opposite end to the condensed water outlet port for condensing steam to form condensate water, (b) a plurality of spaced fins each thermally connected to at least one tube for transmitting heat from at least one tube to the fins, and (c) a powered blower for blowing air between the fins and thus removing heat from the condenser unit.

4,894,124

THERMALLY STABLE DUAL METAL COATED LAMINATE PRODUCTS MADE FROM TEXTURED POLYIMIDE FILM

Daniel P. Walsh, Peabody, Mass., and Philip D. Knudsen, South Berwick, Mich., assignors to Polyonics Corporation, Newbury Port, Mass.

Division of Ser. No. 155,897, Feb. 16, 1988. This application Oct. 31, 1988, Ser. No. 268,246

Int. Cl.[4] C25D *5/54*

U.S. Cl. 204—30 **25 Claims**

1. A process for coating both surfaces of a polyimide sheet with copper in the absence of an adhesive, said process comprising contacting said sheet with a one- phase solution comprising a diamine with the formula $H_2N(CH_2)_nNH_2$ wherein n is an integer between 2 and 6, an alkali metal hydroxide, a water miscible alcohol and water for a time, and at a temperature sufficient to render the surfaces uniformly and substantially completely textured, treating said surfaces with a catalyst to create surfaces receptive to the electroless deposition of nickel or cobalt, depositing nickel or cobalt on said receptive surface by electroless deposition to form nickel or cobalt coated surfaces of said sheet, said deposited nickel or cobalt coatings being electrically conductive, forming microcracks in each of said nickel or cobalt coatings, baking said polyimide sheet coated with nickel or cobalt containing microcracks to volatilize components in said polyimide sheet while avoiding delamination of said coatings and depositing copper on said nickel surface or cobalt surface by electrolytic deposition to form exposed copper coatings on said polyimide sheet.

4,894,125

OPTICALLY BLACK PLIABLE FOILS

Robert J. Fenolia, Broomfield; Donald F. Shepard, Evergreen, and Sharon L. Van Loon, Conifer, all of Colo., assignors to Martin Marietta Corporation, Bethesda, Md.

Filed May 20, 1988, Ser. No. 196,497

Int. Cl.[4] C25D *5/36, 5/44;* F24J *2/36*

U.S. Cl. 204—33 **13 Claims**

1. A composite ductile metal foil having an optically black surface comprising:

a. a metal foil substrate having a thickness effective for shaping and reshaping;

b. a black chromium surface applied to at least one side of said substrate by electrodeposition, said black chromium surface having:

1. a solar absorptivity of at least about 0.95;

2. an emissivity in the range of about 0.4 to about 0.8; and

3. an adhesion strength effective to resist spalling when a two inch by two inch sample of said composite foil is subjected to repeated deformation around a one mil diameter mandrel.

4,894,126

ANODIC COATINGS ON ALUMINUM FOR CIRCUIT PACKAGING

Issa S. Mahmoud, 10500 Settler's Trail, Austin, Tex. 78750

Filed Jan. 15, 1988, Ser. No. 145,805

Int. Cl.[4] C25D *11/08*

U.S. Cl. 204—58 **3 Claims**

1. An aqueous electrolytic anodizing bath for aluminum and its alloys comprising per liter:

from about 6 to about 24 ml sulfuric acid,

from about 5 to about 10 g complexing agent,

from about 2 to about 5 g urea; and

from about 4 to about 8 ml ammoniated colloidal silica

4,894,127

METHOD FOR ANODIZING ALUMINUM

Chun-Ming Wong, and Yukimori Moji, both of Seattle, Wash., assignors to The Boeing Company, Seattle, Wash.

Filed May 24, 1989, Ser. No. 356,059

Int. Cl.[4] C25D *11/08*

U.S. Cl. 204—58.5 **4 Claims**

1. An improved method of anodizing an aluminum alloy workpiece comprising the steps of:

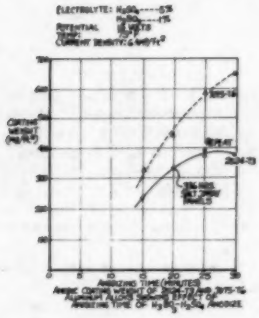
providing an aqueous anodizing solution consisting essentially by weight of about 3 to 5 percent sulfuric acid, from about 0.5 to 1 percent boric acid and not more than about 3.7 percent aluminum ion and 0.2 percent chloride ion;

maintaining said bath at a temperature from about 70 to about 90 degrees F;

immersing said workpiece in said bath;

ramping the voltage applied across said workpiece in said bath from about 5 to about 20 volts; such that the current density is substantially uniform across the workpiece and the average current density does not exceed about 10 amperes per square foot; and

maintaining said workpiece in said bath for a time such that an adherent coating of aluminum oxide is applied thereto



having a coating weight between about 200 and 600 milligrams per square foot.

4,894,128

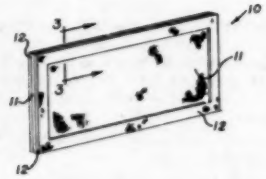
MEMBRANE UNIT FOR ELECTROLYTIC CELL

Richard N. Beaver, Angleton, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed May 5, 1986, Ser. No. 860,703

Int. Cl.[4] C25B *1/16, 1/24, 9/00*

U.S. Cl. 204—98 **23 Claims**



1. An ion exchange membrane unit adapted for electrolyzers of the filter press type having at least one anode frame member and at least one cathode frame member, said electrolyzer adapted for producing an alkali metal hydroxide and a halogen by electrolysis of an alkali metal halide, comprising:

(a) at least one sheet of a hydraulically impermeable cation exchange membrane comprised of fluorocarbon polymers having a plurality of pendant groups selected from the group consisting of sulfonic acid groups, carboxylic acid groups, and mixtures thereof, said membrane material adapted for producing an alkali metal hydroxide and a halogen by electrolysis of an alkali metal halide, said ion exchange membrane having a gasket-bearing surface portion and an active surface portion; and

(b) at least one non-gasket, non-supporting frame reinforcement means for strengthening the gasket-bearing surface portion of the membrane such that tearing or shear stresses on the gasket-bearing surface portion of the membrane is minimized when the gasket-bearing surface portion of the membrane is under a compressive force,

said reinforcement means positioned only along the gasket-bearing surface portion of the membrane on at least one side of the membrane.

19. A method of electrolyzing an alkali metal salt to form an alkali metal hydroxide and a halogen comprising:

(a) interposing at least one membrane unit between at least a cathode frame member having a cathode and at least an anode frame member having an anode forming a catholyte and anolyte compartment;

(b) interposing at least one gasket member between at least one electrode frame member and the membrane unit,

said membrane unit comprising at least one sheet of a hydraulically impermeable cation exchange membrane comprised of fluorocarbon polymers having a plurality of pendant groups selected from the group consisting of sulfonic acid groups, carboxylic acid groups, and mixtures thereof, said membrane material adapted for producing an alkali metal hydroxide and a halogen by electrolysis of an alkali metal halide, and at least one non-gasket, non-supporting frame reinforcement means for strengthening the gasket-bearing surface portion of the membrane such that tearing or shear stresses on the gasket-bearing surface portion of the membrane is minimized when the gasket-bearing surface portion of the membrane is under a compressive force,

said reinforcement means positioned only along the gasket-bearing surface portion of the membrane on at least one side of the membrane;

(c) compressing the electrode frame members, membrane unit and gasket member with a compressive force;

(d) feeding an aqueous alkali metal halide solution to the anode compartment; and

(e) passing an electrical current from the anode to the cathode such that a halide is evolved at the anode.

4,894,129

METHOD AND APPARATUS FOR POSITIONING SHEET-LIKE OBJECTS

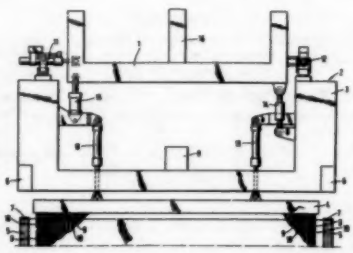
Matti O. Leiponen, and Kyllö-Heikkilä Vilnö I., both of Espoo, Finland, assignors to Outokumpu Oy, Helsinki, Finland

Filed Jan. 20, 1988, Ser. No. 146,236

Claims priority, application Finland, Jan. 22, 1987, 870285

Int. Cl.[4] C25D *17/06*

U.S. Cl. 204—198 **8 Claims**



1. A method for positioning sheet-like objects, anodes and/or cathodes, in an electrolysis tank when the positioning is carried out by utilizing a gripping device connected to a loading member, wherein the gripping device can be moved with respect to the loading member and the electrolysis tank so that the position of the gripping device is adjusted essentially accurately with respect to the electrolysis tank and the loading member, on the basis of the measurements carried out by the aid of identification marks located in the electrolysis tank including making use of measurements of the shape and position of said identification marks in order to adjust the position of the gripping device.

4,894,130

PROCESS FOR ELECTROLYTICALLY DETACHING A PROTECTIVE COATING FROM A BASE METAL SUPERALLOY

Vladimir Sova, Remetschwil, Switzerland, assignor to ASEA Brown Boveri AG, Baden, Switzerland

Filed Dec. 1, 1988, Ser. No. 278,467

Claims priority, application Switzerland, Dec. 1, 1987, 4673/87

Int. Cl.[4] C25F 5/00

U.S. Cl. 204—129.35 9 Claims

1. A process for electrolytically removing a high chromium and nickel-containing or cobalt-containing protective coating from a nickel-based or cobalt-based superalloy base metal component having said protective coating, comprising the steps of:

(i) submerging the component having said protective coating in a solution of 20% NaOH, thereby activating said component;

(ii) submerging the activated component in concentrated HCl for 2 hours;

(iii) placing the component from step (ii) as the anode into an electrolytic cell, said cell containing an electrolyte which contains an oxidizing component which releases oxygen; and

(iv) subjecting the anode component to electrolysis to remove said protective coating.

4,894,131

APPARATUS FOR THE SURFACE TREATMENT OF SYNTHETIC FIBERS OR YARNS

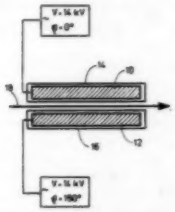
Martinez J. Jacobs, Geleen, and Hendrickus J. J. Rutten, Maastricht, both of Netherlands, assignors to Dyneema V.O.F., Sittard, Netherlands

Filed Sep. 30, 1988, Ser. No. 251,456

Claims priority, application Fed. Rep. of Germany, Oct. 2, 1987, 3733443

Int. Cl.[4] C07C 17/00

U.S. Cl. 204—165 10 Claims



1. An apparatus for the surface treatment of synthetic fibers or yarns, useful for treating polyethylene fibers of ultra-high molecular weight for improvement of the adhesion by means of a corona comprising two elongate linear, insulated, active electrodes, between which the fibers or yarns are passed.

4,894,132

SPUTTERING METHOD AND APPARATUS

Makoto Tanaka, Fukuoka, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Oct. 19, 1988, Ser. No. 259,780

Claims priority, application Japan, Oct. 21, 1987, 62-267158

Int. Cl.[4] C23C 14/54

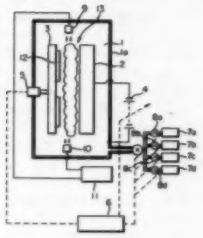
U.S. Cl. 204—192.13 6 Claims

1. A sputtering method comprising:

sputtering a target metal in a glow discharge in sputtering gases to deposit the target metal on a wafer;

measuring an absorption spectrum of the sputtering gases during sputtering of the target metal; and

controlling the sputtering conditions in response to said measurements, including varying the separation between



the target metal and the wafer, to provide a predetermined absorption spectrum.

4,894,133

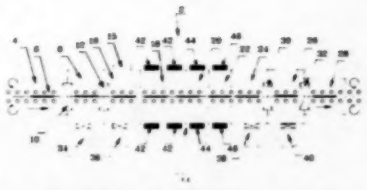
METHOD AND APPARATUS MAKING MAGNETIC RECORDING DISK

Virgle L. Hedgcoth, 1524 Hacienda Pl., Pomona, Calif. 91768, assignor to Virgle L. Hedgcoth, Pomona, Calif.

Continuation of Ser. No. 926,676, Nov. 3, 1986, abandoned, which is a division of Ser. No. 796,768, Nov. 12, 1985, Pat. No. 4,735,840. This application Jun. 22, 1988, Ser. No. 210,119

Int. Cl.[4] C23C 14/34; B65H 1/00

U.S. Cl. 204—192.15 27 Claims



1. A direct current planar magnetron sputtering source process of producing magnetic thin film memory disks with coatings on both sides of the disk, comprising the steps of:

providing substrates;

physically abrading the substrates to provide a uniform series of concentric grooves having a radial roughness factor within the range of 50 to 500 angstroms to encourage a circular anisotropic orientation of crystal growth during subsequent sputtering steps;

providing means for unidirectional transportation of substrates through a sequential series of continual concurrent sputtering processing steps in a deposition chamber having a series of partition walls with apertures for dividing the deposition chamber into separate sputtering chambers at a common pressure level including a carrier for supporting the substrates in vertical positions;

reducing the initial ambient pressure to a reduced common pressure level within a pressure range to enable a sputtering operation while eliminating atmospheric contaminants;

providing a first pair of elongated direct current planar magnetron sputtering sources of a nucleating layer, one on either side of the path of travel of the vertical substrates;

providing a gas in a plasma state of sufficient density to ensure acceptable amplitude modulation characteristics in the finished disks;

bombarding the first pair of nucleating sources with ions from the plasma gas to uniformly deposit a nucleating layer on both sides of the substrate to enable a predeter-

mined epitaxial growth of a subsequent magnetic layer while moving the substrates continually past the sources;

providing a second pair of elongated direct current planar magnetron sources of a magnetic layer on either side of the path of travel of the substrate at a position separate and downstream of the first pair of nucleating sources;

bombarding the second pair of magnetron sources during the same time period as the first nucleating sources are being bombarded to form a magnetic layer whereby a continual coating process on both sides of a substrate can be performed sequentially as substrates are transported through the sputtering process steps;

providing a third pair of elongated direct current planar magnetron sources of a protective layer on either side of the path of travel of the substrate at a position separate and downstream of the second pair of magnetic sources;

bombarding the third pair of protective coating sources to form a protective coating during the same time period as the second magnetron sources are being bombarded to provide a third state of a continual coating process as the substrates are transported through the sputtering process steps; and

removing the coated memory disk without effecting the sputtering operation pressure range.

4,894,134

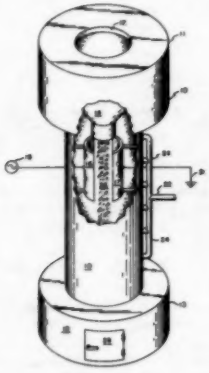
MINERAL REFINEMENT BY HIGH RF ENERGY APPLICATION

Stephen M. Birken, 23 Mohawk Trail, and Karl Birken, 38 Grant Hill Ct., both of Clifton Park, N.Y. 12065

Filed Nov. 27, 1987, Ser. No. 125,938

Int. Cl.[4] B01J *19/08*

U.S. Cl. 204—193 **7 Claims**



1. A refinement apparatus for selectively removing impurities and other unwanted inclusions from a base material comprising:

deposit and collection areas for holding said base material, said deposit area to provide temporary storage means for said base material preparatory to moving it downstream through said refinement apparatus to said collection area, said collection area comprising a repository for refined base material;

conduit means subject to less than ambient atmospheric conditions for transferring said base material from said deposit area towards said collection area;

tunable alternating current radiation means consisting of at least one electrode within the confines of said conduit means for irradiating said base material with high power, variable frequency, radio frequency energy in order to selectively heat and vaporize undesired particulate material that is included within said base material and to fracture encapsulations of undesirable particulate material captured by said base material; and

containment and gas removal means for maintaining said refinement apparatus isolated from ambient atmospheric conditions and for further evacuating said vaporized undesirable particulate material from said conduit means.

4,894,135

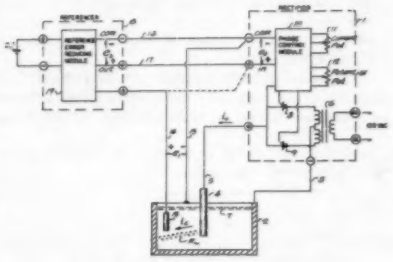
ELECTROLYTE IR VOLTAGE COMPENSATOR FOR CATHODIC PROTECTION SYSTEMS OR THE LIKE

Anthony Farque, 6600 S. 223rd East St., Tulsa, Okla. 74014

Continuation-in-part of Ser. No. 28,361, Mar. 20, 1987, abandoned. This application Apr. 18, 1988, Ser. No. 182,873

Int. Cl.[4] C23F *13/02*

U.S. Cl. 204—196 **17 Claims**



1. In an impressed current cathodic protection system having a controller for rectified AC impressed current passing through an electrolyte with an input for receiving a signal from a reference cell, an IR compensator circuit comprising

a first operational amplifier adapted to receive a signal from a reference cell,

a rectifier diode connected from the output of said amplifier to a node point having a measurable voltage thereat,

a feedback connected from said node point for said amplifier,

a substantially constant current source connected to said node point,

a capacitor connected between said node point and a ground potential point, and

means for supplying said voltage at said node point as the reference cell signal to said controller input.

4,894,136

ELECTROLYTIC TREATMENT OF A SURFACE

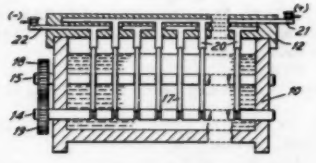
Thomas P. Murphy, Wantage, England, assignor to CMB Packaging (UK) Limited, Reading, England

Division of Ser. No. 186,861, Apr. 27, 1988, Pat. No. 4,828,662. This application Oct. 11, 1988, Ser. No. 255,302

Claims priority, application United Kingdom, May 12, 1987, 8711201

Int. Cl.[4] C25F *7/00*

U.S. Cl. 204—212 **7 Claims**



1. Apparatus for removing a layer of cobalt from a nickel surface on a disc, said apparatus comprising a trough to contain

electrolyte sufficient to immerse most of the disc, means to support the disc for rotation, and means to make electrical contact with the periphery of the discs at a point above the meniscus of the electrolyte.

4,894,137

ENZYME ELECTRODE

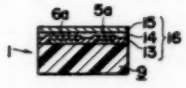
Koichi Takizawa; Satoshi Nakajima, both of Kyoto, and Masato Arai, Muko, all of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Sep. 14, 1987, Ser. No. 95,977

Claims priority, application Japan, Sep. 12, 1986, 61-216391; Sep. 17, 1986, 61-220018; Oct. 3, 1986, 61-236870; Oct. 6, 1986, 61-237298; Oct. 27, 1986, 61-255294; Oct. 29, 1986, 61-257868; Nov. 25, 1986, 61-280346

Int. Cl.[4] C12Q *1/00*

U.S. Cl. 204—403 **20 Claims**



1. An enzyme electrode comprising:

an insulative base;

at least two electrodes including a working electrode and a reference electrode provided on the surface of said insulative base and each having an exposed portion and a connecting portion, the area of the exposed portion of the reference electrode being larger than that of the exposed portion of the working electrode;

an insulative protection film covering the portions excluding said exposed portions and connecting portions of said electrodes; and

an immobilized enzyme film which covers integrally at least the exposed portions of said working electrode.

4,894,138

ELECTROCHEMICAL GASEOUS MEASUREMENT CELL

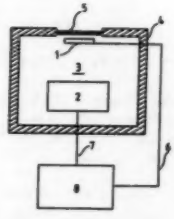
Rudolf Gambert, Arfrade, and Uwe Kuehn, Lubeck, both of Fed. Rep. of Germany, assignors to Drägerwerk AG, Lübeck, Fed. Rep. of Germany

Filed Aug. 22, 1988, Ser. No. 235,385

Claims priority, application Fed. Rep. of Germany, Sep. 2, 1987, 3729287

Int. Cl.[4] G01N *27/46*

U.S. Cl. 204—415 **10 Claims**



1. An electrochemical measurement cell, comprising a housing, an acid electrolyte for galvanic measurement of gases comprising an aqueous solution of an organic acid containing polyfunctional groups suitable to yield protons during measurement, an anode and a cathode arranged in said electrolyte in spaced relationship, a gas evaluation unit connected between said anode and cathode for measuring the gas, and a permeable membrane closing off said electrolyte against the surrounding atmosphere being investigated.

4,894,139

METHODS FOR DEACTIVATING COPPER IN HYDROCARBON FLUIDS

Paul V. Roling, Spring; Dwight K. Reid, Houston, both of Tex., and Joseph H. Y. Niu, Wanaque, N.J., assignors to Betz Laboratories, Inc., Trevose, Pa.

Continuation-in-part of Ser. No. 904,598, Sep. 5, 1986, Pat. No. 4,749,468. This application May 24, 1988, Ser. No. 198,011

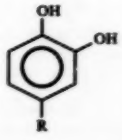
Claims priority, application Canada, May 28, 1987, 538373; European Pat. Off., Aug. 21, 1987, 87307421.5

Int. Cl.[4] C10G *21/00*

U.S. Cl. 208—48 AA **18 Claims**

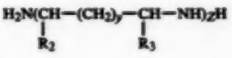
1. A method of deactivating a copper species already present in a hydrocarbon medium during high temperature processing, wherein in the absence of said deactivating method said copper would initiate decomposition of the hydrocarbon medium, said method comprising adding to said hydrocarbon medium an effective amount to deactive said copper species of an effective Mannich reaction product formed by reaction of reactants (A), (B), and (C), wherein (A) comprises an alkyl substituted catechol of the structure

FORMULA I



wherein R is selected from the alkyl, aryl, alkaryl, or arylalkyl of from about 1 to 20 carbon atoms (B) comprises a polyamine of the structure

FORMULA II



wherein z is a positive integer, R_2 and R_3 are the same or different and are independently selected from H, alkyl, aryl, aralkyl, or alkaryl having from 1 to 20 carbon atoms, y being 0 or 1; and (C) comprising an aldehyde of the structure

FORMULA III

wherein R_4 comprises H or C_1–C_6 alkyl.

4,894,140

METHOD OF TREATING WASTE OIL

Christian O. Schön, Römerstrasse 1, D-7590 Achern 18, Fed. Rep. of Germany

Filed Nov. 4, 1987, Ser. No. 116,856

Claims priority, application Fed. Rep. of Germany, Nov. 12, 1986, 3638606; Feb. 3, 1987, 3703110

Int. Cl.[4] C10G *9/14, 51/02*; C10M *1/75*

U.S. Cl. 208—72 **27 Claims**

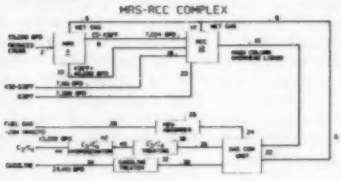
1. A method of continuously treating waste oil or pyrolysis oil, comprising the steps of conveying the oil along a single elongated path in a tubular reactor; heating the oil to progressively higher temperatures in a plurality of successive portions of said path; maintaining the oil in at least some portions of said path at a pressure and velocity such that the oil yields a succession of fractions as a result of heating, pressurization and periods of conveying along said at least some portions of said path; withdrawing the fractions at the downstream ends of the re-

spective portions of said path; and immediately distilling the withdrawn fractions.

4,894,141
COMBINATION PROCESS FOR UPGRADING RESIDUAL OILS

Lloyd E. Busch; Paul W. Walters, and Oliver Zandona, all of Ashland, Ky., assignors to Ashland Oil, Inc., Ashland, Ky.

Continuation-in-part of Ser. No. 355,661, Mar. 12, 1983, abandoned, which is a continuation-in-part of Ser. No. 304,992, Sep. 1, 1981, Pat. No. 4,434,044. This application Jan. 3, 1984, Ser. No. 567,487
Int. Cl.[4] C10G *51/02, 51/04*
U.S. Cl. 208—73 **15 Claims**



1. A method for upgrading high boiling residual portions of crude oils comprising metal contaminants, porphyrins, asphaltenes and high molecular weight multi-ring hydrocarbon material, which method comprises:

A. charging a high boiling residual portion of crude oil admixed with diluent in contact with suspended upflowing substantially inert fluidizable solids particulate material at an elevated thermal visbreaking temperature in a riser contact zone for a time sufficient to recover therefrom a vaporous hydrocarbon product higher boiling than gasoline partially decarbonized and demetallized to a lower contaminating metals level,

B. quenching said vaporous product of thermal visbreaking below its dew point after separation from solids,

C. charging quenched thermally modified high boiling hydrocarbon product comprising metal contaminants in admixture with thermally produced naphtha in contact with a crystalline zeolite cracking catalyst maintained under cracking conditions for a hydrocarbon residence time in a riser cracking zone in the range of 0.5 to 3 second providing a riser outlet product temperature within the range of 510° C. (950° F.) to 593° C. (1100° F.),

D. recovering a hydrocarbon conversion product of said zeolite cracking operation comprising gasoline, lower and higher boiling product components separated from catalyst particles,

E. separating a combined C_4 minus wet gas product stream of said visbreaking and zeolite catalyst cracking operating to recover a C_3–C_4 rich fraction separately from a C_2 minus dry gas product fraction, and

F. regenerating said crystalline zeolite containing catalyst comprising carbonaceous deposits of said cracking operating in a sequence of separate regeneration zones provided with catalyst cooling transferred between zones under conditions to produce a CO rich flue as and high temperature catalyst particles suitable for recycle to said zeolite cracking operation; wherein vaporous hydrocarbon products of each said inert solids and catalyst contacting steps comprise naphtha and lower boiling materials which are processed together under conditions to effect the recovery of a C_3 minus dry gas stream from a C_3–C_4 rich gaseous product stream and a naphtha boiling range product separated from a light cycle oil product is used to effect separation of C_2 minus products from a C_2–C_4 rich product stream.

4,894,142
HYDROCRACKING PROCESS EMPLOYING LOW ACIDITY Y ZEOLITE

Karl Z. Steigleder, Glen Ellyn, Ill., assignor to UOP, Des Plaines, Ill.

Continuation-in-part of Ser. No. 29,938, Mar. 24, 1987, abandoned, which is a continuation-in-part of Ser. No. 781,562, Sep. 9, 1985, abandoned. This application Feb. 28, 1989, Ser. No. 316,723
Int. Cl.[4] C10G *23/00, 47/20*
U.S. Cl. 208—111 **19 Claims**

1. In a hydrocraking process for the production of middle distillates having boiling points of 149°–371° C. in which a hydrocarbon feed stream is passed into contact with a catalyst composition comprising a refractory inorganic oxide matrix and a hydrogen form zeolite having the characteristic X-ray powder diffraction pattern of zeolite Y, with the zeolite having a unit cell size between about 24.2 and 24.40 Angstroms, at hydrocracking conditions and a product stream is recovered; the improvement which comprises employing as said zeolite a low acidity zeolite having an ion exchange capacity greater than 0.07, and a bound hydroxyl content sufficiently low to provide an Ammonia temperature programmed desorption (NH_3-TPD) acidity strength value of less than about 2.00.

4,894,143
CATALYTIC CRACKING PROCESS EMPLOYING AN ALUMINUM SILICON SPINEL-MULLITE-GAMMA ALUMIA CONTAINING CATALYST

Roger J. Lussier, Ellicott City, Md., assignor to W. R. Grace & Co.-Conn., New York, N.Y.

Division of Ser. No. 63,374, Jun. 8, 1987, abandoned, which is a division of Ser. No. 802,484, Nov. 27, 1985, abandoned, which is a continuation-in-part of Ser. No. 657,859, Oct. 5, 1984, abandoned. This application Sep. 26, 1988, Ser. No. 248,758
Int. Cl.[4] C10G *11/05*
U.S. Cl. 208—120 **5 Claims**

1. A method for catalytically cracking hydrocarbons which comprises reacting a hydrocarbon feedstock with a catalytic composition comprising an aluminum silicon spinel-mullite-gamma alumina bound composite in which the spinel phase has a silica to alumina ratio of above about 0.40 and characterized by a surface area of from about 100 to 300 m2/g, a total pore volume of from about 0.30 to 0.70 cc/g, the x-ray pattern set forth in Table B, and an alkali-metal oxide content of below about 0.50 weight percent.

4,894,144
PREPARATION OF LOWER SULFUR AND HIGHER SULFUR COKES

Bruce A. Newman, and Bharat S. Chahar, both of Ponca City, Okla., assignors to Conoco Inc., Ponca City, Okla.

Filed Nov. 23, 1988, Ser. No. 275,295
Int. Cl.[4] C10G *31/06*
U.S. Cl. 208—131 **8 Claims**

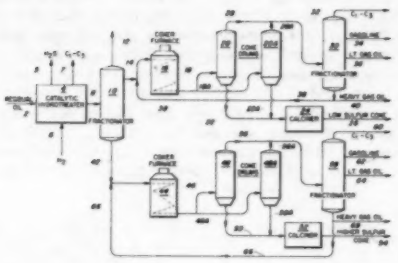
1. A process for producing a lower sulfur coke and higher sulfur coke from a single feedstock which comprises:

(1) catalytically hydrotreating a virgin heavy oil having an API gravity of from about −5 to about 25 and an initial boiling point of from about 550° F. to about 1,000° F. to reduce the sulfur content of the hydrotreated product to not more than about 0.75 weight percent.

(2) separating the hydrotreated product into a heavy fraction and a light fraction,

(3) separately subjecting each fraction to delayed coking,

(4) calcining the resulting green coke products to obtain (a) from the coked light fraction a low sulfur calcined coke,



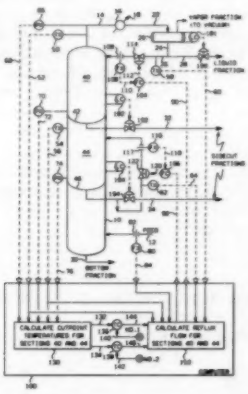
and (b) from the coked heavy fraction a higher sulfur calcined coke.

4,894,145

AUTOMATIC CONTROL OF FEEDSTOCK VACUUM TOWERS

Bruce A. Jensen, Bartlesville, Okla., assignor to Applied Automation, Inc., Bartlesville, Okla.

Filed Jul. 19, 1988, Ser. No. 221,484
Int. Cl.[4] B01D *3/42*
U.S. Cl. 208—350 **15 Claims**



11. A method for maintaining a desired cut point between fractions withdrawn from a fractional distillation tower, wherein a feed oil stream containing hydrocarbons is distilled in said tower, wherein the hydrocarbon components of said feed oil stream exhibit a sufficiently wide boiling point range to yield a plurality of fractions, wherein a total drawoff tray is located at a first point along the length of said fractional distillation tower, wherein the volume of said fractional distillation tower above said total drawoff tray defines a section of said fractional distillation tower, wherein an overhead vapor stream is withdrawn from an upper portion of said fractional distillation tower, cooled, and then provided to an overhead accumulator, said method comprising the following steps:

maintaining a liquid level above said drawoff tray, such that said section of said fractional distillation tower includes a liquid zone and a vapor zone;

withdrawing a first liquid fraction from said overhead accumulator;

providing a reflux stream at a second point along the length of said fractional distillation tower wherein said second point is located above said first point in the upper part of said vapor zone;

withdrawing a second liquid fraction from said fractional distillation tower from said total drawoff tray;

withdrawing a bottom fraction from said fractional distillation tower;

establishing a first signal representative of the vapor pressure at the top of said fractional distillation tower;

establishing a second signal representative of the pressure differential between said total drawoff tray and the top of said fractional distillation tower;

establishing a third signal representative of the vapor temperature in said vapor zone;

establishing a fourth signal which is representative of the cut point temperature between said first liquid fraction and said second liquid fraction;

comparing said fourth signal and said fifth signal and for establishing a sixth signal responsive to the difference between said fourth signal and said fifth signal; and

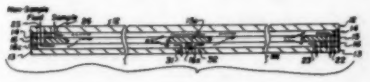
manipulating the flow rate of said reflux stream in response to said sixth signal to thereby maintain said fourth signal substantially equal to said fifth signal.

4,894,146

THIN CHANNEL SPLIT FLOW PROCESS AND APPARATUS FOR PARTICLE FRACTIONATION

John C. Giddings, Salt Lake City, Utah, assignor to University of Utah, Salt Lake City, Utah

Continuation-in-part of Ser. No. 67,487, Jun. 29, 1987, abandoned, which is a continuation-in-part of Ser. No. 822,529, Jan. 27, 1986, abandoned. This application May 20, 1988, Ser. No. 196,449
Int. Cl.[4] B03B *7/00*; B03C *5/00*
U.S. Cl. 209—12 **32 Claims**



1. A continuous process for fractinating small particles as small as polypeptides and no larger than biological cells contained in a fluid stream comprising:

a. continuously introducing two or more fluid substreams of different composition into the inlet end of a thin enclosed channel having an inlet end possessing at least two inlet means and an outlet end possessing at least two outlet means and having a thickness which is very thin compared to the other two dimensions and is less than 5 millimeters, and has a length of not more than about 20 centimeters, and bringing a substream into contact with adjacent substreams so as to collectively form a series of thin laminae flowing parallel to one another within the channel and in contact with one another over a sufficient length of channel to allow a desired level of mass transport between and through the laminae without substantial hydrodynamic mixing between the laminae,

b. continuously introducing a fluid medium containing the particles to be separated by means of one of said inlet means into one or more of the fluid substreams and varying the fluid composition of the non-particle containing substreams as needed to realize separation,

c. at the outlet end of the channel splitting the collective channel stream into another set of substreams so as to permit separate recovery of at least two of the substreams at separate outlet means at the outlet end of the channel,

d. adjusting the flow rates at the inlet end as well as at the outlet end so as to obtain the desired separation,

e. continuously removing all of the substreams being separated at least two separate outlet means at the outlet end of the channel,

f. during the separation process subjecting the channel to one or more transverse driving forces or gradients having a component perpendicular to the plane of the flow stream in the channel, and being selected from the group consisting of gravitation, centrifugation, electrical, dielectrical forces, cross-flow forces, temperature gradients, density gradients and concentration gradients, and combinations thereof.

4,894,147

DEVICE FOR SCREENING PULP AND A BLADE FOR THE SCREENING DEVICE

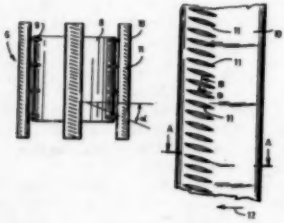
Veli-Matti Rajala, Tampere, Finland, assignor to OY Tampella AB, Tampere, Finland

Filed Feb. 22, 1989, Ser. No. 314,375

Claims priority, application Finland, Mar. 7, 1988, 881049

Int. Cl.[4] B07B *1/20*

U.S. Cl. 209—273 **13 Claims**



1. A device for screening pulp for removing a rejected pulp fraction from a desired pulp fraction, comprising

a screen drum (2) having a surface provided with openings and allowing the passage of the desired pulp fraction therethrough, and

a plurality of substantially upwardly extending blades (10) mounted close to the surface of the screen drum (2), one of the screen drum (2) and the blades (10) being mounted rotatably for movement in a predetermined direction around the axis of the screen drum (2) so that the blades (10) and the surface of the screen drum (2) move with respect to each other through a rotatory motion, and the pulp being introduced into the screening device to one end of the screen drum (2) and said rejected pulp fraction traveling along the axis of the screen drum in a discharge direction to be discharged from the other end thereof, characterized in that in order to transfer the rejected pulp in the discharge direction, at least some of the blades (10) are provided with grooves (11) transverse to the upward extend of the blades (10), said grooves being so inclined with respect to the direction of the movement of the blades (10) with respect to the surface of the screen drum (2) that a foremost end of each groove (11) in the direction of movement is, along the axis of the drum in the discharge direction, at a greater distance from the other end of the screen drum than a rearmost end of the same groove (11) in the direction of movement.

4,894,148

DEVICE FOR SEPARATING A HETEROGENEOUS MASS OF SOLID MATERIAL INTO FRACTIONS

Josef Frei, Oberchrendingen, Switzerland, assignor to Organ-Faser Technology B.V., Haarlem, Netherlands

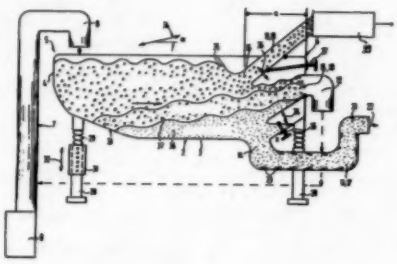
Filed Apr. 28, 1987, Ser. No. 43,373

Claims priority, application Fed. Rep. of Germany, Apr. 28, 1986, 3614324

Int. Cl.[4] B03B *13/00*

U.S. Cl. 209—479 **2 Claims**

1. A device for separating high density and low density constituents from a heterogeneous mass of solid material in household, industrial, and other similar waste, in which the material is first dried and then separated into said constitutents, comprising a trough-shaped container having a material charging end for receiving the mass, a vibrator connected to said container to produce vibrations causing the segregation of said high density constituents downwards and said low density constituents upwards, said container having a lower zone and an upper zone; take-off devices in both said lower zone and upper zone, and an intermediate take-off device arranged between the take-off devices in said upper and lower zones, said take-off devices being operable for removing the separated constituents from the container, said intermediate take-off device being connected to a material charging device which



leads back to the upper zone of the container, said take-off devices in said upper and lower zones and said intermediate take-off device each having a take-off opening and a conveyor means subsequent thereto, each of said take-off devices further constituting pipes such that at least one of the take-off openings is arranged in a wall of the container, wherein the conveyor means of the take-off device in said upper zone includes an exhaust device connected thereto, the take-off pipe of said device in said upper zone projects into the container from above, and further wherein the take-off pipe of said device in said upper zone is inclined towards the material charging end of said container and the inclination is adjustable to ensure that the take-off device in the upper zone removes only the low density constitutents.

4,894,149

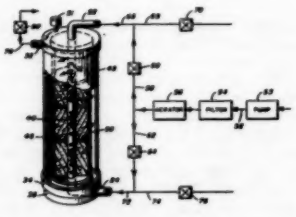
BIOLOGICAL FILTRATION DEVICE

Steven J. Block, 9368 Oakwilde Ave., Stockton, Calif. 95212

Filed Sep. 16, 1988, Ser. No. 245,169

Int. Cl.[4] B01D *27/02*

U.S. Cl. 210—101 **21 Claims**



1. A filtration device comprising:

an assembly of three concentric elongated tubular members adapted for use in a generally vertical position, having a closure wall at each end, the inner and middle tubular members being perforated over substantially their entire lengths to permit water flow therethrough, and the outer

tubular member being substantially imperforate over its entire length;

a first inlet means communicating with the interior of said inner tubular member at one end thereof, and a second inlet means communicating with the interior of said inner tubular member at the other end thereof;

outlet means communicating with the interior of said outer tubular member;

a filtration medium in the space between said middle tubular member said inner tubular member defining a filtration chamber, the perforations of said inner and middle tubular members not passing said medium therethrough; and

dividing means laterally dividing said inner tubular member into upper and lower non-communicating portions and laterally dividing said filtration chamber into upper and lower non-communicating filtration chambers.

4,894,150

MECHANICAL DEVICE FOR SIMPLIFYING FLUID BALANCE IN HEMOFILTRATION

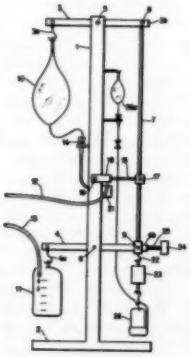
Hans-Joachim Schurek, Sperlingsfeld 9, and Jörg-Dieter Biela, Wilhelm-Blum-Str. 19, both of D-3000 Hanover, Fed. Rep. of Germany

Continuation of Ser. No. 820,442, Jan. 17, 1986, abandoned, which is a continuation-in-part of Ser. No. 483,280, Apr. 8, 1983, abandoned. This application Jun. 2, 1988, Ser. No. 205,618

Claims priority, application Fed. Rep. of Germany, Apr. 10, 1982, 3213390

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—101 **30 Claims**



1. A device for equalizing the rate of flow of substitution liquid and the rate of flow of filtrate in a filtration system, where a waste-enriched liquid is filtered, a portion of the waste-enriched liquid is removed as filtrate, and the removed portion of the waste-enriched liquid is at least partially replaced by the substitution liquid, said device comprising: a filter for waste-enriched liquid, said filter including an inlet means in communication with means defining a supply of the waste-enriched liquid, a first outlet means in communication with means defining a source of substitution liquid, and a second outlet means in communication with means defining a reservoir for the filtrate; a mechanical balancing system including a stand, means provided on said stand for supporting the source of the substitution liquid at a first level above the filter, and means on said stand for supporting the reservoir for the filtrate at a second level below the filter, said balancing system undergoing deflection in response to a difference between an instantaneous equilibrium force and the instantaneous total weight of the liquid in the source and the reservoir on the respective supporting means; a control unit provided on said stand at a third level between said first and second levels and including means for regulating the rate of flow of the substitution liquid from the source on the respective supporting means to the reservoir for the filtrate; a counterweight connected to each of said supporting means to perform movements jointly with the source and the reservoir; and a mechanical linkage having means for mechanically transmitting motion between said balancing system and said control unit in such a manner that said control unit changes the flow rate of the substitution liquid from the source on the respective supporting means in response to deflection of said balancing system.

4,894,151

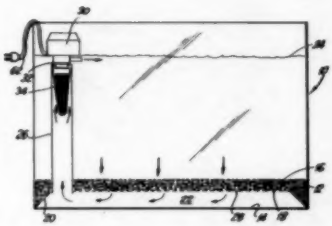
FILTER CARTRIDGE FOR AN UNDERGRAVEL AQUARIUM FILTER

Klaus Woltmann, Demarest, N.J., assignor to Willinger Brothers, Inc., Oakland, N.J.

Filed Oct. 12, 1988, Ser. No. 256,904

Int. Cl.[4] A01K *63/04*

U.S. Cl. 210—169 **14 Claims**



1. A combination of an undergravel filter with a power head for filtering water in an aquarium, comprising:

a perforated plate carrying thereon a gravel bed and forming with a bottom wall of an aquarium chamber;

a riser tube extending upwardly from said perforated plate and connecting said chamber with said power head, said power head being mounted at the top of said riser tube and constructed so as to suck water from said chamber, said power head including means for returning water sucked from said chamber into an aquarium tank; and

a filter cartridge connected to said power head and immersed into said riser tube to filter the water before it is returned into said aquarium tank by said power head,

wherein said cartridge includes a substantially elongated perforated portion of a substantially conical configuration and a cylindrical portion, said conical portion containing a filter material, and

wherein said cartridge further includes a perforated plug inserted thereinto between said conical portion and said cylindrical portion, said plug being of a substantially conical configuration to provide for an increased filtering surface for the water passing towards the power head.

4,894,152

FLUID CONTROL DEVICE

Arthur E. Colvin, Jr., Mount Airy, Md., and Matthew W. Hanley, Washington, D.C., assignors to Cerex Corporation, Gaithersburg, Md.

Filed Aug. 13, 1987, Ser. No. 84,880

Int. Cl.[4] B01D *15/08*

U.S. Cl. 210—198.2 **7 Claims**

1. A fluid control device for a fluid chromatography system comprising:

a plate;

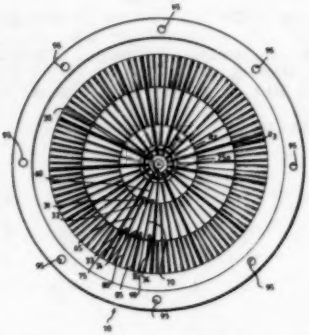
an aperture centrally located through said plate for introducing fluid to said system;

radially oriented channels formed in one side of said plate and radiating outward from said aperture with a slope

such that the channels decrease in depth from the center portion to the outer edge portion of said plate;

raised radial flutes located in said radially oriented channels to divide said channels into at least two radially oriented subchannels;

structure wherein said radially oriented channels are confined to a region extending from an inner edge at the edge of said centrally located aperture in the plate to an outer edge at a predetermined radius from the center of said centrally located aperture with:



radius r_1 located between said inner and outer edges; a first set of equally spaced, raised radial flutes extending from said inner edge to said outer edge defining a first set of channels;

a second set of equally spaced, raised radial flutes extending from radius r_1 to said outer edge and being positioned so as to bisect said first set of channels into a first set of equal subchannels; and

a porous plug located in the centrally located aperture located through said plate adjacent said radially oriented channels for helping force fluid into

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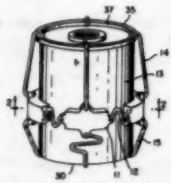
4,894,153

MAGNETIC ATTACHMENT FOR A FILTER

Hossain A. Shirdavani, 14425 NE. 37th Pl., Apt. G6, Bellevue, Wash. 98007

Filed Nov. 28, 1988, Ser. No. 276,529
Int. Cl.[4] B01D *35/06*
U.S. Cl. 210—222 **2 Claims**



1. Apparatus for augmenting the function of a filter for liquids, said filter having a casing, a top rim, a length and a bottom having a center, said apparatus comprising:

a plurality of magnets,

first springs interconnecting said magnets,

links connecting said magnets to said top rim,

a ring positioned at said center of said bottom and

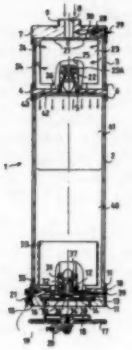
second springs interconnecting said magnets to said ring, whereby said first springs position said magnets around said casing and said links, ring and second springs position said magnets along said length on said casing.

4,894,154

INDIVIDUAL PORTABLE WATER-TREATMENT DEVICE

Bernard Roz, Brlis Sous Forge, and Jacques Andre, Sainte Genevieve des Bois, both of France, assignors to Societe de Recherche Techniques et Industrielles (SRTI), Buc, France

Filed Jun. 15, 1988, Ser. No. 206,728
Claims priority, application France, Jun. 19, 1987, 87 08637
Int. Cl.[4] C02F *9/00*
U.S. Cl. 210—266 **14 Claims**



1. An individual, portable water-treatment device comprising as water-treatment components a first filtering device, for the filtering of suspended matter, a charge of absorbent, a charge of ion exchangers and a second filtering device for filtering micro-organisms, wherein said components are contained in an elongated enclosure comprising a confining wall, an inlet end and an outlet end, a first closure at the inlet end provided with an inlet for water to be treated and, at its outlet end a second closure provided with an outlet for treated water, and means for imperviously closing the outlet during off periods and opening the outlet during on periods and wherein the first filtering device is in a chamber of the enclosure adjacent to the inlet end closure and separated from the rest of the enclosure containing the charges and the second filtering device by a impervious partition wall fixed to the confining wall of the elongated enclosure and provided with means defining a hole and means fixed at the hole for closing the hole imperviously during off periods and for permitting opening of the hole during on periods.

4,894,155

SINGLE MEMBRANE DISC SUPPORTING UPPER AND LOWER MEMBRANES

Richard A. Leoncavallo, Pittsford, and Gregory R. Phillips, Penfield, both of N.Y., assignors to Nalge Company, Rochester, N.Y.

Filed Apr. 14, 1988, Ser. No. 181,417
Int. Cl.[4] B01D *13/00*
U.S. Cl. 210—321.84 **8 Claims**

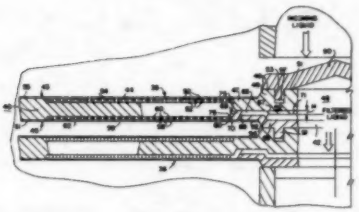
1. A filter assembly comprising a housing having a central filter chamber, said housing having an inlet for allowing entry of a liquid to be filtered, filter means disposed in said filter chamber for filtering of a liquid entering said chamber and an exhaust port for allowing exit for the liquid that has been filtered from said filter chamber, said filter means comprising at least one disc shaped filter assembly having a central opening for communication with said exhaust port, said disc shaped filter assembly comprising:

an upper annular integrally formed support disc having a top membrane support surface, a central axial opening communicating with said exhaust port, and a lower membrane

support surface, said upper top membrane support surface and a lower membrane support surface each having a plurality of primary annular extending grooves for channeling a liquid and a plurality of main radially extending collection grooves for collecting said liquid from said primary grooves, said disc having at least one axial groove for connecting said collection grooves in said upper top membrane support surface with said collection grooves in said lower membranes support surface;

a first filter membrane disposed on said top surface covering said primary grooves and said connecting grooves, said membrane being sealingly secured to said top surface so that only liquid passing through said first membrane flows onto said primary and collection grooves;

a lower aligning integrally formed support disc for mating with the bottom surface of said upper annular support disc, said aligning support disc having an axial opening for communication with said axial opening of said upper annular support disc, said aligning support disc having a top surface facing said upper annular support disc, said top surface having a plurality of radially extending ribs which engage the bottom surface with said upper annular support disc and form a plurality of radially extending grooves which connect said collection grooves of said lower mombrane support surface with said axial opening of said upper angular support disc;



a second filter membrane disposed on said lower membrane support surface overlapping at least a portion of said lower aligning disc, said second filter membrane covering said primary and connecting grooves on said bottom surface and the space between said support disc and aligning disc and sealingly secured thereto so that only liquid which has passed through said first or second membrane passes to said axial opening;

means for aligning said lower aligning support disc with said upper annular support disc, said means comprising an annular shoulder in said lower surface of said upper annular support disc in said central portion and an annular projection on the upper surface of said upper aligning disc for mating with said annular shoulder; and

means for allowing stacking a plurality of said disc assemblies comprising a recess in the upper surface of said upper top membranes surface and an annular projection on the upper surfaces of said aligning support disc, said projection being designed to engage said recess.

4,894,156

HOSE CONSTRUCTION, COUPLING ARRANGEMENT THEREFOR AND METHOD OF MAKING THE SAME

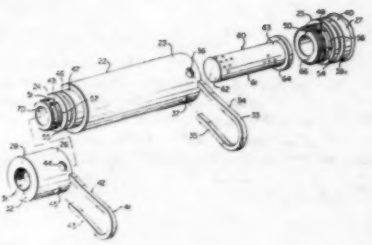
Joseph S. Murken, Springfield, Mo., assignor to Dayco Products, Inc., Dayton, Ohio

Division of Ser. No. 192,326, Apr. 25, 1988, Pat. No. 4,806,248, which is a continuation of Ser. No. 92,788, Sep. 2, 1987, abandoned, which is a division of Ser. No. 881,533, Jul. 2, 1986, Pat. No. 4,707,262. This application Oct. 13, 1988, Ser. No. 257,371

Int. Cl.[4] B01D *35/00*

U.S. Cl. 210—448 **1 Claim**

1. In a method of making a coupling arrangement for conveying fluid therethrough and having a filter unit disposed therein to filter the fluid flow through said coupling arrangement, the improvement comprising the steps of forming said coupling arrangement to be a quick connect-disconnect coupling arrangement that comprises a first tubular coupling member having opposed open ends, a second tubular coupling member having opposed open ends one of which is telescopically disposed in one of said ends of said first coupling member, and a removable fastening member securing said one ends of said coupling members together in the telescoping relation thereof, forming said filter unit to have means that is held between said one ends of said coupling members when said one ends are in said secured telescoping relation thereof whereby said filter unit is secured in said coupling arrangement by said means thereof, disposing an annular flexible sealing member to



be carried by said coupling arrangement and be in a compressed relation therein to provide a loading force on said filter unit and on said fastening member, forming said means of said filter unit to comprise an outwardly directed annular flange, forming said one end of said first coupling member to have an internal annular shoulder means, forming said one end of said second coupling member to have an annular shoulder means, disposing said annular flange of said filter unit to be held in sandwiched relation between said shoulder means when said one ends are in said secured telescoping relation, and forming one of said shoulder means to carry said annular flexible sealing member in said compressed relation between said one shoulder means and said annular flange of said filter unit when said one ends are in said secured telescoping relation.

4,894,157

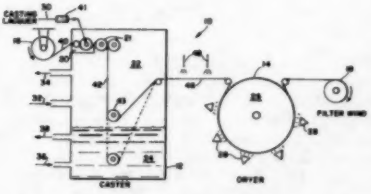
PROCESS FOR PRODUCING SUPPORTED CELLUOSIC MEMBRANES AND PRODUCTS

James S. Johnson, Acton, Mass., assignor to Micron Separations, Inc., Westborough, Mass.

Filed Oct. 5, 1987, Ser. No. 103,960

Int. Cl.[4] B01D *31/00*

U.S. Cl. 210—490 **25 Claims**



1. A continuous process for producing an integral, bubble pointable microporous cellulosic membrane filter having an integral support web embedded therein, comprising:

(a) preparing a casting lacquer comprising at least one cellulosic polymer, at least one solvent for the polymer, and at least one non-solvent pore former wherein the casting lacquer is at the point of incipient gelation;

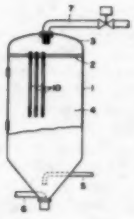
(b) conveying a non-woven polymer support web through the casting lacquer from step (a) so as to effect complete wetting of the web and coating of the lacquer as a fluid-film of uniform thickness on either surface of the web;
(c) conveying the film coated web through an environmentally controlled atmosphere for a time sufficient to effect evaporation of the solvent and non-solvent pore formers and gelation of the cellulosic polymer occurs, thereby forming a microporous cellulosic membrane on either side of the web; and
(d) drying the membrane coated support to remove residual solvents and non-solvent.

4,894,158

POROUS FILTER ELEMENT WITH UNDULATIONS

Tadashi Morita, Gamagori; Kazuhiro Nomura, Sayama, and Yoshiyuki Matsushima, Tokyo, all of Japan, assignors to Kirin Beer Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 31, 1987, Ser. No. 80,304
Claims priority, application Japan, Sep. 11, 1986, 61-214526
Int. Cl.[4] B01D *27/04*
U.S. Cl. 210—497.2 **8 Claims**



1. A porous filter element for filtering a liquid, said filter element comprising a plurality of seamless filter element units that are made of stainless steel powder wherein the range of particle diameter of said stainless steel powder is between 0.100–0.355 mm, wherein these particles are sintered into a final shape at a sintering density of 4.0–5.8 g/cc, a pore ratio of 28–50% and a nominal passage pore size of 10–40μ, and wherein an outside surface of said filter element units is formed with minor undulations so as to form bedding surfaces that facilitate the adhesion of an auxiliary filtering agent to the filter element units.

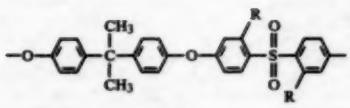
4,894,159

METHOD OF MANUFACTURING A REVERSE OSMOSIS MEMBRANE AND THE MEMBRANE SO PRODUCED

Michael D. Guiver, Ottawa; André Y. Tremblay, and Chung M. Tam, both of Vanier, all of Canada, assignors to National Research Council of Canada, Ottawa, Canada

Filed Jun. 5, 1989, Ser. No. 361,341
Int. Cl.[4] B01D *13/00, 13/04*
U.S. Cl. 210—500.41 **10 Claims**

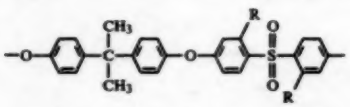
1. A method of manufacturing a reverse osmosis membrane; comprising:
(a) casting a polysulfone casting composition on to a support, the polysulfone casting composition comprising:
(i) an aromatic polysulfone derivative having repeat units, at least an average of about 20% of which are carboxylated and are of the formula I:



(I)

, wherein each R in each formula is ortho to the sulfone, at least one R in each formula is a carboxyl group with any remainder thereof being hydrogen, and
(ii) a solvent for the aromatic polysulfone derivative, then
(b) evaporating solvent from the cast polysulfone casting composition, then
(c) gelling the cast polysulfone casting composition in a gelation medium to form a reverse osmosis membrane therefrom.

10. A reverse osmosis membrane of an aromatic polysulfone derivative having repeat units, at least an average of about 20% of which are carboxylated and are of the formula I:



(I)

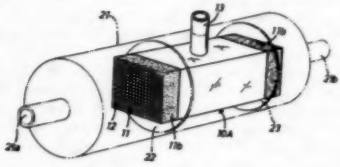
wherein each R in each formula is ortho to the sulfone, at least one R in each formula is a carboxyl group with any remainder thereof being hydrogen.

4,894,160

HONEYCOMB STRUCTURE FOR FLUID FILTRATION

Fumio Abe, Handa, and Hiroshi Mori, Nagoya, both of Japan, assignors to NGK Insulators, Ltd., Nagoya, Japan

Filed Sep. 6, 1988, Ser. No. 240,723
Claims priority, application Japan, Sep. 4, 1987, 62-222771; Sep. 4, 1987, 62-222772
Int. Cl.[4] B01D *29/00*
U.S. Cl. 210—510.1 **14 Claims**



1. A honeycomb structure for fluid filtration comprising means for providing a resistance ratio between a selective membrane and a support of porous ceramic material sufficient to substantially enhance filtration efficiency of the honeycomb structure, said structure comprising:
a support of porous ceramic material having a plurality of axially parallel passageways extending therethrough and uniformly spaced by porous partition walls to permit flow of pressurized fluid therethrough; and
a selective membrane coated onto the surface of the passageways to separate one or more components from the fluid and to permit flow of filtrate passing therethrough to be carried through the porous partition walls to an exterior surface of the partition walls for collection, said selective membrane having an average pore size of about 10–10,000 angstroms;
wherein the porous partition walls are formed to permit the passage of filtrate therethrough at a flow quantity which is more than 20 times the flow quantity of filtrate passing

through said selective membrane and said partition walls, collectively.

4,894,161

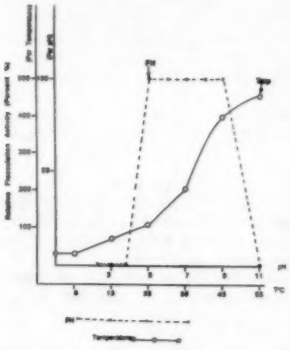
PROCESS FOR CLARIFYING A LIQUID USING A POLYMERIC SUBSTANCE

Moshe Shilo, Jerusalem, and Ali Fattom, Maale Hagalil, both of Israel, assignors to Solmat systems, Ltd., Yavne, Israel

Division of Ser. No. 634,535, Jul. 26, 1984, Pat. No. 4,649,110, which is a continuation of Ser. No. 403,047, Jul. 29, 1982, abandoned. This application Nov. 7, 1986, Ser. No. 927,947

Int. Cl.[4] C02F 1/54

U.S. Cl. 210—602 **17 Claims.**



1. A process for clarifying a liquid containing particulates comprising treating said liquid by adding a bioflocculant excretion of a bacteria selected from the group of cyanobacteria of the Phormidium genus in a concentration sufficient of flocculate particles in the liquid.

4,894,162

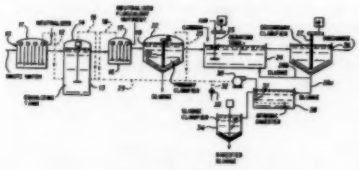
TREATMENT OF VOLATILE ORGANIC SUBSTANCES AT WASTE WATER TREATMENT PLANTS

Richard Cournoyer, Whitehouse Station, N.J.; Thomas Jakopp, Kaisten, Switzerland, and G. E. Friberg, Toms River, N.J., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Apr. 27, 1988, Ser. No. 187,035

Int. Cl.[4] C02F 3/20

U.S. Cl. 210—603 **7 Claims**



1. In a method for purifying industrial waste effluent including both waste water and off-gases containing volatile organic solvents by an aerobic biological waste water treatment system containing an aerobic treatment zone comprising a mixture of biologically active solids and activated carbon for treating the waste water, which involves subjecting the industrial waste water to a primary treatment to at least adjust the pH of the industrial waste water and remove the solids therefrom, subjecting the thus treated waste water to treatment in an aerobic biological treatment zone, supplying the biological treated waste water to a separation zone to separate the sludge produced in the aerobic treatment zone from the waste water to purify the waste water, transferring at least a portion of this sludge to an aerobic digesting zone, wherein the sludge is reduced in volume by action of aerobic microorganisms located therein, the improvement comprising concurrently collecting the off-gases containing volatile organic solvents in the industrial waste water primary treatment system, directing the thus collected off-gases to either the aerobic treatment zone or the aerobic digesting zone or to both the aerobic treatment zone and the aerobic digesting zone to biologically degrade and substantially eliminate the volatile organic solvents in the off-gases.

4,894,163

SEPARATION OF LIQUID MIXTURES

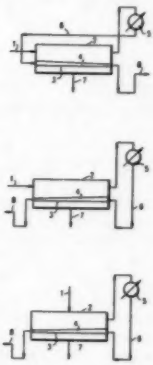
Kazunori Watanabe, Tsukuba, and Yoshio Fuchigami, Okayama, both of Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan

Filed Jun. 6, 1988, Ser. No. 202,527

Claims priority, application Japan, Jun. 12, 1987, 62-147305

Int. Cl.[4] B01D 13/00

U.S. Cl. 210—640 **14 Claims**



1. A method of separating liquid mixtures by pervaporation which comprises feeding a feed liquid mixture to a membrane separator in the form of a mixed fluid at least part of which is in the form of a vapor to thereby cause said vapor to come into direct contact with a liquid film originating from the liquid mixture and occurring on a permeation membrane such that said vapor is partially condensed in said liquid film, to obtain a permeate fraction and a non-permeated liquid portion.

4,894,164

APPARATUS FOR TREATING BLOOD IN AN EXTRACORPOREAL CIRCUIT

Hans-Dietrich Polaschegg, Oberursel, Fed. Rep. of Germany, assignor to Fresenius AG, Bad Homburg von der Hohe, Fed. Rep. of Germany

Filed Oct. 27, 1987, Ser. No. 114,346

Claims priority, application Fed. Rep. of Germany, Oct. 30, 1986, 3636995

Int. Cl.[4] B01D 13/00

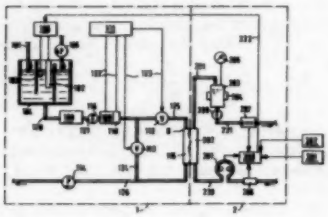
U.S. Cl. 210—646 **22 Claims**

1. A method for withdrawing heat from blood in a extracorporeal circuit employing a treatment solution wherein blood is brought into contact with the treatment solution along a membrane and wherein the treatment solution has been heated in a source supplying the treatment solution, in order to maintain energy balance of a patient, the method comprising:

establishing a reference temperature value for the blood prior to starting treatment;

messuring the temperature of blood emerging from said patient's body during use of the treatment solution to obtain a first measured temperature value correlated with the body temperature of the patient;

comparing the first measured temperature value with the reference value to obtain a comparison value; and



continuously adjusting the temperature of the treatment solution in response to the comparison value to maintain the comparison value in order to maintain an energy balance of the patient.

4,894,165

REJECTION ENHANCING COATINGS FOR REVERSE OSMOSIS MEMBRANES

Richard F. Fibiger, Midland; Michael J. Colucci, Saginaw; David J. Forgach, Midland; Ritchie A. Wessling, Midland, and Donald L. Schmidt, Midland, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 162,824, Mar. 2, 1988, Pat. No. 4,828,700, which is a continuation-in-part of Ser. No. 75,497, Jul. 20, 1987.

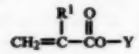
This application May 8, 1989, Ser. No. 348,928

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—654 **3 Claims**

1. A process for separation of water having a reduced solute concentration from a concentrated aqueous solution comprising contacting a reverse osmosis membrane with the concentrated solution at conditions which promote selective permeation of water through the membrane wherein said membrane comprises a cellulose diacetate, cellulose triacetate or polyamide reverse osmosis membrane having an effective amount of a water-soluble, vinyl-addition polymer deposited on the membrane sufficient to enable a reduction in salt passage by at least about 20 percent while decreasing water flux by not more than about 20 percent at standard reverse osmosis test conditions or enabling an increase in water flux by at least 5 percent without any substantial increase in salt passage, wherein said polymer is derived from:

(a) at least about 5 weight percent of a carboxylic acid monomer of the formula

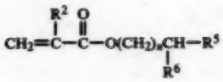


wherein R^1 is hydrogen, methyl, $-CH_2OH$ or

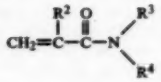
wherein j is an integer from 1 to 5; and

(b) a remaining amount of a compatible ethylenically unsaturated monomer, with the proviso that where R^1 is hydrogen, then at least 5 weight percent of

(c) an ethylenically unsaturated monomer of the Formula II or III



(II)



(III)

must be present, wherein R^2 at each occurrence is independently methyl, ethyl, or $-CH_2OH$; R^5 is —H, —OH, methyl or ethyl; R^6 is —OH, $-OCH_2CH_2-_mOH$, $-NR^7R^7$ or $-CH_2OH$; n is an integer from 1 to 3; m is an integer from 1 to 15; R^7 is at each occurrence independently —H, $-CH_3$, $-CH_2CH_3$ or $-CH_2CH_2OH$; R^3 is —H, $-CH_2-_kOH$, methyl or ethyl; R^4 is —H, $-CH-_2-_kOH$, methyl or ethyl and k at each occurrence is an integer from 1 to 4, and wherein (a) and (c) together account for at least about 50 weight percent of the monomers from which the vinyl-addition polymer is derived.

4,894,166

METHOD FOR CLEANING OIL-CONTAMINATED WATER IN A SWIMMING OR BATHING AREA

Robert L. Pitts, Fremont, Ohio, assignor to Packaging Industries Group, Inc., Hyannis, Mass.

Continuation of Ser. No. 947,820, Dec. 30, 1986, abandoned.

This application Aug. 28, 1988, Ser. No. 237,628

Int. Cl.[4] C02F *1/28*

U.S. Cl. 210—663 **9 Claims**

1. A method for cleaning oil-contaminated water in a closed recirculating swimming or bathing system which includes a skimmer device comprising:

circulating at least one oil absorber comprising compressible, oleophilic, hydrophobic crosslinked polyolefin foam on a surface of said oil-contaminated water, said at least one absorber having a compressible curved outer surface, and

skimming oil contaminants from the surface of the water,

whereby said at least one absorber removes oil from the surface of said water.

4,894,167

PROCESS FOR REMOVING HEAVY METAL CATIONS AND/OR ALKALI METAL CATIONS FROM AQUEOUS SOLUTIONS WITH AN ION EXCHANGER MATERIAL

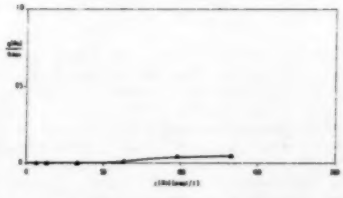
Wolfgang Holl, Ettlingen; Siegfried Eberle, Eggenstein, and Jurgen Horst, Karlsruhe, all of Fed. Rep. of Germany, assignors to Kernforschungszentrum Karlsruhe GmbH, Fed. Rep. of Germany

Filed Apr. 11, 1988, Ser. No. 179,779

Claims priority, application Fed. Rep. of Germany, Apr. 11, 1987, 87105409

Int. Cl.[4] B01J *49/00*; C02F *1/42*

U.S. Cl. 210—673 **5 Claims**



1. Process for removing heavy metal cations and/or alkali

metal cations from an aqueous solution with an ion exchanger material that contains a cation exchanger loaded with alkaline earth metal ions, and subsequently regenerating the loaded or exhausted ion exchanger material comprising:

contacting an aqueous solution which contains heavy metal ions and/or alkali metal ions with an ion exchange material comprising a cation exchanger loaded with alkaline earth metal ions, and

subsequently regenerating the loaded or exhausted cation exchanger, either alone or in a mixture with an anion exchanger, by introducing a CO_2-containing gas into an aqueous suspension containing at least one (a) slightly soluble carbonate of an alkaline earth metal ion, (b) slightly soluble hydroxide of an alkaline earth metal ion, or (c) a completely or partially calcined natural carbonate wherein the partial pressure of the CO_2 in the suspension is from 0.1 to 10 bar, and bringing the CO_2-containing suspension into contact with the loaded or exhausted cation exchanger.

4,894,168

PROCESS FOR THE REMOVAL OF CATIONS OF AN ALKALINE EARTH METAL SPECIES FROM AQUEOUS SOLUTIONS WITH AN ION EXCHANGER MATERIAL

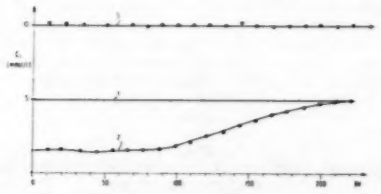
Wolfgang Holl, Ettlingen; Siegfried Eberle, Eggenstein, and Jurgen Horst, Karlsruhe, all of Fed. Rep. of Germany, assignors to Kernforschungszentrum Karlsruhe GmbH, Fed. Rep. of Germany

Filed Apr. 11, 1988, Ser. No. 179,780

Claims priority, application Fed. Rep. of Germany, Apr. 11, 1987, 87105409

Int. Cl.[4] B01J *49/00*; C02F *1/42*

U.S. Cl. 210—673 **2 Claims**



1. Process for selectively removing cations of a first alkaline earth metal species from an aqueous solution containing several alkaline earth metal species with an ion exchanger material that is a cation exchanger or contains one, and subsequently regenerating the loaded or exhausted ion exchanger material, comprising:

(a) contacting the aqueous solution containing several alkaline earth metal species with a cation exchanger that has been loaded in advance with cations of a second alkaline earth metal species, to remove the cations of the first alkaline earth metal, and

(b) regenerating the cation exchanger that is loaded or exhausted with the first species to be removed by bringing the loaded or exhausted cation exchanger into contact with an aqueous suspension of a slightly soluble carbonate and/or hydroxide of the second alkaline earth metal species, either alone or in combination with an anion exchanger, and introducing a CO_2-containing gas into the suspension, to elute the first alkaline earth metal species from the cation exchanger and to condition the cation exchanger with the second alkaline earth metal species in a single processing step.

4,894,169

METHOD OF INHIBITING IRON SALT DEPOSITION IN AQUEOUS SYSTEMS USING UREA SALTS

Mona Delitsky, Pasadena, Calif., assignor to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 177,191, Apr. 4, 1988, abandoned. This application Oct. 13, 1988, Ser. No. 257,253

Int. Cl.[4] C02F *5/12*

U.S. Cl. 210—698 **5 Claims**

1. A method for inhibiting precipitation of iron salts including iron phosphate in an aqueous system, said method comprising adding to said system an effective amount of a water soluble urea salt selected from the group consisting of urea nitrate, urea disodium salt and urea sulfate at concentrations ranging from 10 mg/l to 400 mg/l.

4,894,170

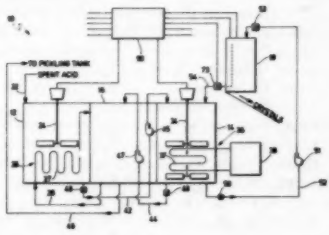
LIQUID RECOVERY SYSTEM AND METHOD

Richard D. Billmyre, 4822 Fauna La., Indianapolis, Ind. 46234

Filed Feb. 27, 1989, Ser. No. 315,809

Int. Cl.[4] B01D *17/00, 21/00*

U.S. Cl. 210—712 **30 Claims**



1. A liquid recovery system for separating dissolved solid material from a spent liquid to provide a recovered liquid comprising:

means for providing continuous operation and means for providing batch operation; said means for providing batch operation first including

a first tank;

input means for delivering spent liquid to

said means for providing continuous operation first including said first tank in a substantially continuous manner;

said means for providing batch operation next including

a second tank;

first fluid coupling means for transferring a quantity of spent liquid from said first tank to said second tank;

a separator for separating solid material from said spent liquid in said second tank to provide a recovered liquid in said second tank;

a third tank;

second fluid coupling means for transferring a quantity of recovered liquid from said second tank to said third tank; and

said means for providing continuous operation next including

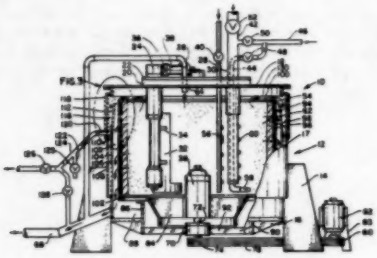
output means for delivering recovered liquid out of said third tank in a substantially continuous manner.

4,894,171

METHOD FOR REMOVING SALTS FROM HERBICIDE SOLUTIONS

Keith H. Nichols, Houston, Tex., assignor to Fermenta Plant Protection Company, Mentor, Ohio

Filed Feb. 29, 1988, Ser. No. 162,094
Int. Cl.[4] B04B 3/00
U.S. Cl. 210—772 **7 Claims**



1. A method for removing salts from a herbicide solution comprising the steps of:

applying a filter media onto the internal walls of a rotating spin basket of a centrifugal apparatus having:

an outer cylindrical casing for enclosing a vertically rotatable spin basket, having a top wall, vertical side walls and a bottom wall;

wherein said top wall supports: a means for applying filter media onto the internal walls of said spin basket;

a means for spraying a herbicide solution containing salt solids from a feed tank onto the filter media present on the internal walls of said spin basket thereby separating the salt solids from the solution which penetrates through the filter media;

a means for spraying solvent onto the salt solids and filter media present on the internal walls of said spin basket thereby washing excess solution from the salt solids and the filter media; and

a vertically rotatable plowing means for plowing the salt solids and spent filter media from the spin basket;

wherein said vertical side walls support:

an internal upper collection trough for collecting liquid overflow from said spin basket when said spin basket is rotated; and

with said bottom wall, an internal lower radial collection chamber for collecting filtrate which flows through said spin basket when said spin basket is rotated; and wherein said bottom wall has openings for passage of spent filter media and means for supporting the spin basket within said casing;

wherein said spin basket is of smaller diameter and shorter height than said casing and is centered on a vertical axis and rotatable relative to said supporting means about said axis by means of a central hub having a plurality of spokes secured at their inner ends to the hub and at their outer ends to said spin basket;

wherein said basket has means for supporting a filter bed including a radially outer layer of fine mesh screening and a radially inner layer of precoat filter media;

and wherein said basket has a closed top ledge portion to support said filter bed, an open top portion to permit solution overflow when flow through said precoat filter bed is restricted and an open bottom to permit passage of spent filter media;

an overflow discharge outlet in communication with said upper overflow collection trough, wherein said overflow discharge outlet is connected to piping for transporting fluid collected from said upper overflow collection trough;

a filtrate discharge outlet in communication with said lower collection chamber, wherein said filtrate discharge outlet is connected to piping for transporting fluid collected from said lower collection chamber; and

a driving means for rotating said spin basket;

spraying a herbicide solution containing salt solids onto the filter media present on the internal walls of said rotating spin basket where the centrifugal force produced by the rotating spin basket forces (i) a first portion of the salt solution to penetrate through the filter media and the spin basket into the internal layer radial collection trough of the apparatus, thereby depositing the salt solids present in the herbicide solution onto the filter media, and (ii) a second portion of the salt solution to progress vertically up the filter media surface, over the top ledge of the rotating spin basket, and into the internal upper radial collection trough of the apparatus;

spraying a solvent solution onto the salt solids and the filter media present on the internal walls of said rotating spin basket where the centrifugal force produced by the rotating spin basket forces (i) a first portion of the solvent solution to penetrate through the salt solids, the filter media, and the spin basket into the internal lower radial collection trough, thereby washing the excess herbicide solution from the salt solids and the filter media, and (ii) a second portion of the solvent solution to progress vertically up the filter media surface containing the salt solids, over the top ledge of the rotating spin basket into the internal upper radial collection trough of the apparatus, thereby washing the herbicide solution from the salt solids, the filter media surface, and the internal radial collection trough;

recycling a portion of said solvent solution from the upper radial collection trough to said feed tank

increasing the rotation speed of said spin basket thereby increasing the centrifugal force produced by the rotating spin basket and forcing excess solvent and herbicide solution out of said filter media into said internal lower radial collection trough; and,

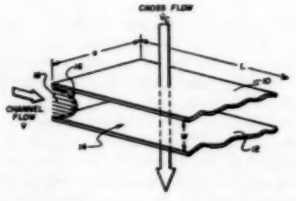
decreasing the rotation speed of said spin basket and plowing the salt solids and spent filter media from the spin basket whereby the plowed solids fall through openings in the bottom of said spin basket and casing.

4,894,172

PROCESS FOR PROGRAMMING OF FIELD-FLOW FRANCTIONATION

Philip S. Williams, Salt Lake City, Utah, assignor to University of Utah, Salt Lake City, Utah

Filed Aug. 29, 1988, Ser. No. 237,188
Int. Cl.[4] B03B 5/00
U.S. Cl. 210—748 **9 Claims**



5. In a field-flow fractionation process wherein a carrier fluid containing a small particulate, polymeric or macromolecular sample to be separated is forced through a thin flow channel with the carrier fluid flowing in the direction of the flow axis and a field force or gradient is used to induce a driving

force acting across the thin channel perpendicular to the flow axis, the improvement comprising holding the field strength S of the field force constant at an initial level S_o for a time-lag period t_1, and then decaying the field strength with time t according to the equation

$$S = S_0\left[\frac{t_1 - t_a}{t - t_a}\right]^p$$

wherein $t \geq t_1 > t_a$, $t_1 \geq 0$ and $p > 0$, and holding the mean channel flow velocity <v> constant, with the above symbols representing the following

S=field strength

S_o=field strength at initial constant level

t_1=time lag period which is time for field strength held constant

t=time for decaying field strength

t_a=remaining time parameter

p=number of power when decaying field strength

<v>=mean channel flow velocity.

4,894,173

DIVALENT ION TOLERANT AROMATIC SULFONATES

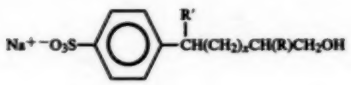
Roman Loza, Solon; Arthur J. Cooper, Garfield Heights, and Gerald P. Coffey, Lynnhurst, all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Division of Ser. No. 204,061, Jun. 8, 1988, Pat. No. 4,836,283. This application Nov. 14, 1988, Ser. No. 270,869

Int. Cl.[4] E21B *43/22*

U.S. Cl. 252—8.554 **12 Claims**

1. A surfactant composition for use in enhanced oil recovery comprising a compound having the following formula:



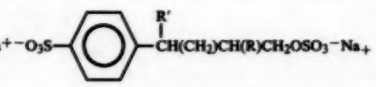
where

x=0 to 4

R'=H or CH_3

$R=CH_3(CH_2)y$ and y=1 to 15.

2. The surfactant composition of claim 1 further comprising a second compound having the following formula:



wherein R, x, y, and R' are the same as defined in claim 1.

4,894,174

ANTI-OXIDANT COMPOSITIONS

Mary F. Salomon, Cleveland Heights, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio

Continuation of Ser. No. 60,183, Jun. 9, 1987, Pat. No. 4,764,299. This application Jun. 24, 1988, Ser. No. 188,589

Int. Cl.[4] C10M *135/22*; C07C *149/14*

U.S. Cl. 252—48.2 **25 Claims**

1. A composition of the formula

$RS(AS_xAO)_yAS_xASR^1$

wherein x is 1 or greater, y is 1 or greater and R and R^1 are hydrocarbyl groups, A is an alkylene group and provided further that one of R and R^1 contains at least 5 carbon atoms.

4,894,175

CRUDE OIL WITH A DEPRESSED POUR POINT

Götz Koerner; Dietmar Schaefer, both of Essen; Roland Berger, Bochum; Hans-Ferdi Flak, and Heinz Duman, both of Essen, all of Fed. Rep. of Germany, assignors to Th. Goldschmidt AG, Essen, Fed. Rep. of Germany

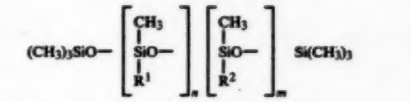
Division of Ser. No. 27,518, Mar. 18, 1987, abandoned. This application Feb. 18, 1988, Ser. No. 157,734

Claims priority, application Fed. Rep. of Germany, Apr. 29, 1986, 3614412

Int. Cl.[4] C10M *1/50*; H01B *3/20*

U.S. Cl. 252—78.3 **12 Claims**

1. A crude oil having a depressed pour point, containing from about 0.005 to about 0.5 weight percent of a pour point depressant compound of the general formula:



in which

R^1 is alkyl with 18 to 36 carbon atoms with at least 40% of the alkyl grous having at least 22 carbon atoms,

R^2 is hydrogen, methyl or a substituent containing polar groups, with

R^2 being the same or different within the average molecule,

$n \geq 30$ and

$m = 0$ to n/2; and mixtures thereof.

4,894,176

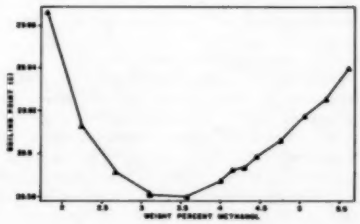
AZEOTROPE-LIKE COMPOSITIONS OF 1,1-DICHLORO-1-FLUOROETHANE, DICHLOROTRIFLUOROETHANE AND METHANOL

Ellen L. Swan, Ransomville; Rajat S. Basu, and Ian R. Shankland, both of Williamsville, all of N.Y., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Continuation-in-part of Ser. No. 290,124, Dec. 27, 1988. This application Jan. 17, 1989, Ser. No. 297,467

Int. Cl.[4] C11D *7/50*, *7/30*

U.S. Cl. 252—171 **20 Claims**



1. Azeotrope-like compositions consisting essentially of from about 60.0 to about 94.0 weight percent 1,1-dichloro-1-fluoroethane, from about 5.0 to about 35.5 weight percent dichlorotrifluoroethane selected from the group consisting of 1, 2-dichloro-1,2,20trifluoroethane, 1,1-dichloro-2,2,2-trifluoroethane or mixtures thereof and from about 1.0 to about 4.7 weight percent methanol wherein the composition with 1,2-dichloro-1,2,2-trifluoroethane boils at about 29.90° C.±0.3° C. at 760 mm Hg, the composition with 1,1-dichloro-2,2,2-trifluoroethane boils at about 29.58° C.±0.3° C. at 760 mm Hg and the composition with mixtures of the dichlorotrifluoroethanes boils at about 29.64° C.±0.3° C. at 760 mm Hg.

8. Azeotrope-like compositions consisting essentially of 1,1-dichloro-1-fluoroethane, dichlorotrifluoroethane selected

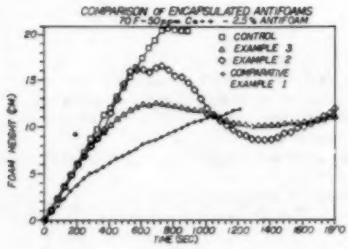
from the group consisting of 1, 2-dichloro-1,2,2-trifluoroethane, 1,1-dichloro-2,2,2-trifluoroethane or mixtures thereof and methanol wherein the composition with 1,2-dichloro-1,2,2-trifluoroethane boils at about 29.70° C.±0.3° C. at 760 mm Hg, the composition with 1,1-dichloro-2,2,2-trifluoroethane boils at about 29.58° C.±0.3° C. at 760 mm Hg and the composition with mixtures of the dichlorotrifluoroethanes boils at about 29.64° C.±0.3° C. at 760 mm Hg.

4,894,177

AGGLOMERATED GRANULES FOR THE DELAYED RELEASE OF ANTIFOAMING AGENTS IN LAUNDERING SYSTEMS

Michael S. Starch, Lincoln Township, Midland County, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Apr. 7, 1988, Ser. No. 178,951
Int. Cl.[4] B01D *19/02, 19/04*; C11D *3/22, 3/37*
U.S. Cl. 252—174.15 **52 Claims**



1. A delayed release antifoam laundry additive consisting essentially of one or more conventional silicon based antifoam agents held on a carrier comprising water soluble modified cellulose, wherein said antifoam agent is contained in said laundry additive in an amount of from about 10 to 45' wt. % based on the weight of said antifoam agent and said carrier taken together, said delayed release antifoam laundry additive being formed by the process comprising the steps of:

(i) first uniformly loading said antifoam agent on said carrier;

(ii) then mixing said carrier in the presence of an amount of a solvent for said carrier sufficient to cause agglomeration of said carrier: and

(iii) then driving the solvent from the carrier.

51. A method of forming agglomerated granules for the delayed release of antifoam agent in water which comprises loading one or more conventional silicon based antifoam agents on a carrier of water soluble modified cellulose, wherein said antifoam agent is contained in said laundry additive in an amount of from about 10 to 45 wt. % based on the weight of said antifoam agent and said carrier taken together then mixing the carrier loaded with antifoam agent in the presence of a solvent for the carrier in an amount sufficient to agglomerate said carrier.

4,894,178

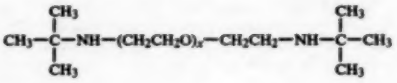
ABSORBENT COMPOSITION CONTAI ING SEVERELY-HINDERED AMINE MIXTURE FOR THE ABSORPTION OF H_2S

W. S. Winston Ho, Annandale; Eugene L. Stogryn, Edison, and Guido Sartori, Annandale, all of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Oct. 13, 1987, Ser. No. 106,796
Int. Cl.[4] C09K *3/00*
U.S. Cl. 252—189 **4 Claims**

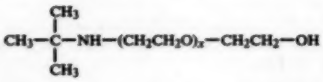
1. An absorbent composition comprising a mixture of:

(1) a first severely hindered amine with the formula:



and

(2) a second severely hindered amine with the formula:



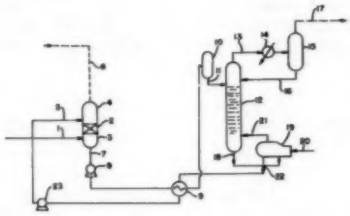
wherein said first and second severely hindered amines have a cumulative $-E_s$ value greater than 1.75, with x being an integer ranging from 2 to 6 and the weight ratio of the first amine to the second amine ranging from 0.43:1 to 2.3:1.

4,894,179

ABSORBENT COMPOSITION CONTAINING A TERTIARY AMINO AZABICYCLIC ALCOHOL AND AN AMINE SALT

Guido Santori; W. S. Winston Ho, both of Annandale, and Eugene L. Stogryn, Edison, all of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Oct. 13, 1987, Ser. No. 106,797
Int. Cl.[4] C09K *3/00*
U.S. Cl. 252—189 **10 Claims**



1. A composition comprising: (1) at least one tertiary amino azabicyclic alcohol and (2) an amine salt, said amine salt being the reaction product of said azabicyclic alcohol and a component selected from the group consisting of an acid having at least one pKa of not more than about 7, a decomposable salt of an acid having at least one pKa of not more than about 7, a compound capable of forming an acid having a pKa of not more than about 7 and a mixtures thereof, said amine salt and said tertiary azabicyclic alcohol being present in said composition in a mole ratio of said amine salt to said tertiary amino azabicyclic alcohol of at least about 0.2:1 to 4:1.

4,894,180

LIQUID CRYSTAL OPTICAL ELEMENT

Takashi Takayanagi, and Hideo Kawaguchi, both of Fujinomiya, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jan. 7, 1988, Ser. No. 141,381
Claims priority, application Japan, Jan. 7, 1987, 62-1383; Jan. 8, 1987, 62-2465
Int. Cl.[4] C09K *19/52*
U.S. Cl. 252—299.01 **10 Claims**

1. A liquid crystal optical element comprising a nematic side chain type polymeric liquid crystal having added therein at least one compound selected from the group consisting of:

(a) adamantane, 1,3-dimethyladamantane, 1-bromoadaman-

tane, 1-chloroadamantane, 2-bromoadamantane, 2-chloroadamantane, 2-adamantanol, 1,3-dimethyladamantane-5,7-diol, 1-hydroxymethyladamantane, 1-cyanoadamantane, ethyl 1-adamantanecarboxylate, 1-acetylaminoadamantane, and 1-aminomethyladamantane, and

(b) terphenyl or a terphenyl derivative represented by the formula:

wherein X and Y each represents a hydrogen atom, an alkyl group, an oxyalkyl group, a halogen atom, a nitrile group, a nitro group, or an alkyl ester group,

wherein said compound or compounds is or are present in a total amount of from 0.01 to 15% by weight based on the polymeric liquid crystal.

4,894,181

CARBOCYCLIC COMPOUNDS

Klaus Praefcke; Bernd Kohne, both of Berlin, and Eike Poetsch, Mühltal, all of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft Mit Beschrankter Haftung, Darmstadt, Fed. Rep. of Germany

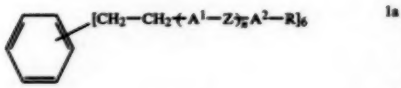
Division of Ser. No. 843,406, Mar. 24, 1986, Pat. No. 4,758,373. This application May 16, 1988, Ser. No. 194,668

Claims priority, application Fed. Rep. of Germany, Mar. 22, 1985, 3510325

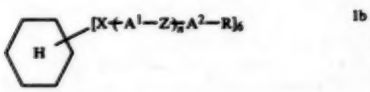
Int. Cl.[4] C09K *19/34, 19/32, 19/30, 19/20, 19/12*

U.S. Cl. 252—299.61 **16 Claims**

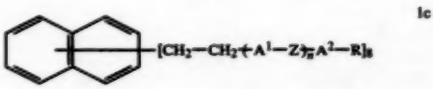
1. A carbocyclic compound of the formula 1a, 1b or 1c



1a



1b



1c

wherein the substituents $[X\text{-}(A^1\text{-}Z)_n\text{-}A^2\text{-}R]$ opposite each other are situated equatorially and in the trans-position,

wherein

X is $-CH_2-(CH_2)_p-$ or $-CH_2-(CH_2)_p-$ wherein one or two non-adjacent CH_2 groups are replaced by —O—, —S—, —CO—, —O—CO—, —CO—O— or —CH=CH,

p is 0, 1 or 2,

A^1 and A^2 independently are each 1,4-phenylene or 1,4-phenylene substituted by halogen, CH_3 or CN; 1,4-phenylene or 1,4-phenylene substituted by halogen, CH_3 or CN wherein one or more CH groups are replaced by N atoms; 1,4-cyclohexylene, 1,4-cyclohexylene substituted in the 1-position or 4-position by CN or 1,4-cyclohexylene wherein one or two non-adjacent CH_2 groups are replaced by —O— or —S—; piperidine-1,4-diyl; or 1,4-bicyclo[2.2.2]octylene,

Z is —CO—O—, —O—CO—, —O—, $—CH_2—$, $—CH_2O—$, $—OCH_2—$, $—CH_2CH_2—$, —CHCN—CH_2—, —CH_2—CHCN—, —CH=CH—, —CH=N, —N=CH—, —NO=N—, —N=NO— or a single bond,

n is 0, 1 or 2 and

R is alkyl of 1 to 20 C atoms or alkyl having 1 to 20 C atoms wherein one or more non-adjacent CH_2 groups are replaced by —O—, —CO—, —O—CO—, —CO—O— or —CH=CH—, F, Cl, Br, I, OH, NH_2, COOH or CN.

4,894,182

ORGANOPHILIC CLAY GELLANT AND PROCESSES FOR PREPARING ORGANOPHILIC CLAY GELLANTS

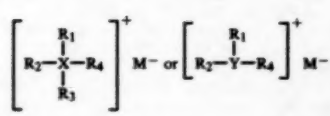
Charles A. Cody, Robbinsville, and Steven J. Kemnetz, Trenton, both of N.J., assignors to NL Chemicals, Inc., Hightstown, N.J.

Filed Oct. 19, 1987, Ser. No. 109,393

Int. Cl.[4] B01J *13/00;* **C08K** *9/04;* **C08L** *67/00*

U.S. Cl. 252—315.2 **32 Claims**

1. An organophilic clay gellant comprising the reaction product of a smectite-type clay having a cation associated therewith and having a cation exchange capacity of at least about 75 milliequivalents per 100 grams of said clay and an organic cation derived from an organic cation/anion compound having the general formula:



or mixtures thereof wherein X is a nitrogen or phosphorus, Y is sulfur, M^- is an anion, R_1 is a lineal or branched, saturated or unsaturated alkyl group having 12 to 22 carbon atoms and R_2, R_3 and R_4 are independently selected from (a) lineal or branched alkyl group having 1 to 22 carbon atoms; (b) aralkyl groups which are benzyl and substituted benzyl moities including fused ring moieties having lineal or branched 1 to 22 carbon atoms in the alkyl portion of the structure; (c) aryl groups including phenyl and substituted phenyl including fused ring aromatic substituents; (d) data, gamma, unsaturated groups having six or less carbon atoms or hydroxyalkyl groups having 2 to 6 carbon atoms; and (e) hydrogen and wherein the improvement comprises the reaction product of the cation from the smectite-type clay and M^- is water, a gas, an insoluble compound having a solubility constant of 1×10^{-2} or less in water at room temperature or a mixture thereof.

4,894,183

COMPOSITION AND USE THEREOF AS DYEING OR TEXTILE AUXILIARY

Rosemarie Töpfl, Dornach, and Heinz Abel, Reinach, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

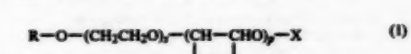
Continuation of Ser. No. 835,001, Feb. 28, 1986, abandoned. This application Jan. 20, 1988, Ser. No. 147,093

Claims priority, application Switzerland, Mar. 7, 1985, 1024/85

Int. Cl.[4] B01D *17/00*

U.S. Cl. 252—358 **13 Claims**

1. A composition which comprises a mixture of which at least one component is an acid ester of the formula



(I)

wherein

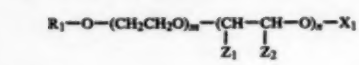
s is 3 to 10, p is 5 to 15,

R is an aliphatic radical of an unsaturated or saturated monoalcohol containing 6 to 24 carbon atoms;

one of Z_1 and Z_2 is methyl and the other is hydrogen, and

X is the acid radical of a low molecular aliphatic dicarboxylic acid, and

at least one other component of which composition is an acid ester of the formula:



(2)

wherein

m is 3 to 10, n is 5 to 15,

R_1 is an aliphatic radical of not less than 6 carbon atoms or is alkylphenyl containing 4 to 16 carbon atoms in the alkyl moiety;

one of Z_1 and Z_2 is methyl and the other is hydrogen, and

X_1 is the acid radical of an inorganic oxygen-containing acid.

4,894,184

LOW-TEMPERATURE BURNT CONDUCTIVE PASTE AND METHOD OF MANUFACTURING PRINTED CIRCUIT BOARD

Shingoro Fukuoka, Tokyo; Kouichi Shintomi, Yokohama; Ryu Maeda, Tokyo, and Kaisuke Shiroyama, Nikko, all of Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan

Filed Apr. 27, 1987, Ser. No. 43,096

Claims priority, application Japan, Aug. 27, 1986, 61-200731

Int. Cl.[4] H01B *1/06*

U.S. Cl. 252—512 **13 Claims**

1. A low-temperature burnt conductive paste comprising an organic vehicle having dispersed therein a composition comprising 50 to 95% by weight of a powder of at least one conductive material selected from the group consisting of a copper alloy, a copper oxide and a copper alloy oxide and 5 to 50% by weight of a glass powder having a softening point of 300° to 600° C. and a coefficient of thermal expansion of 6 to 13×10^{-6}° $C.^{-1}$, said copper alloy being selected from the group consisting of Cu-Ag, Cu-Sn and Cu-Ag-Sn, said Ag-containing alloys having a Ag content of from 0.05 to 50% by weight and, said Sn-containing alloys having a Sn content of from 0.01 to 10% by weight, and each of said copper oxide and copper alloy oxide having an oxidation ratio of 0.1 to 100%.

4,894,185

COPRECIPITATION METHOD FOR THE MANUFACTURE OF ZINC OXIDE BASED DOPED POWDERS

Gérald Djega-Mariadassou, Igny, France; Vinh H. Tran, Bruxelles Belgique, Belgium; Monique Bureau Tardy, Paris, and Alain Lagrange, Marsannay La Cote, both of France, assignors to Compagnie Europeenne De Compasants Electroniques LCC, Courbevoie, France

Filed Nov. 30, 1987, Ser. No. 126,853

Claims priority, application France, Dec. 2, 1986, 8616803

Int. Cl.[4] H01C *7/10*

U.S. Cl. 252—519 **16 Claims**

1. A method of forming zinc oxide based doped powder, comprising:

(a) preparing one or more aqueous solutions of soluble salts of zinc and at least one other metal element employing quantities of said zinc and metal elements sufficient to achieve a zinc oxide based powder in which zinc and said metal elements are present in the relative quantities desired;

(b) separately preparing an aqueous buffer solution saturated with salts of each of the elements in the solutions prepared in step (a), and possessing a pH which is selected so as to cause precipitation of the hydroxylated compounds of said zinc and other metal elements in the solution of step (a);

(c) adding the one or more prepared solutions of step (a) to the buffer solution of step (b), thereby forming a mixed solution and causing the precipitation of a mixed hydrated metal oxide product from the mixed solution, and compensating for any drop in pH in the mixed solution obtained by the addition of an appropriate amount of base while maintaining the volume of the buffer solution constant by the withdrawal of the appropriate quantities of solution as the solutions of step (a) are added to the buffer solution; and

(d) preparing a zinc oxide based doped powder from said precipitate by calcining it in air.

4,894,186

SUBSTITUTED PYRAZOLINE HAVING NON-LINEAR OPTICAL PROPERTIES

Paul F. Gordon, and Brian Bothwell, both of Rochdale, United Kingdom, assignors to Imperial Chemical Industries PLC, London, England

Division of Ser. No. 98,996, Sep. 21, 1987, Pat. No. 4,780,543.

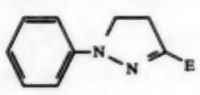
This application Sep. 23, 1988, Ser. No. 262,391

Claims priority, application United Kingdom, Oct. 7, 1986, 8624020; Oct. 14, 1986, 8624643

Int. Cl.[4] C07D *231/06*; G02B *5/00*

U.S. Cl. 252—582 **6 Claims**

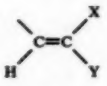
1. A crystal of a compound of the formula:



I

wherein

E is an ethenyl group of the formula:



II

in which X is H and Y is NO_2;

Y is H and X is NO_2; or

X is CN and Y is CN

in which a substantial proportion of the molecules of the defined compound are aligned in the same manner so that the crystal has non-linear optical properties.

4,894,187

FLAME RESISTANT COMPOSITIONS AND METHOD OF USING SAME

Evelyne Bonnet, Lamorlaye; Andre Gagnieur, Rochetaille sur Saone, and Bernard Gurtner, Grenoble, all of France, assignors to Atochem, Courbevoie, France

Filed Feb. 8, 1988, Ser. No. 153,181

Claims priority, application France, Feb. 12, 1986, 86 01917

Int. Cl.[4] C09K *21/00*

U.S. Cl. 252—609 **18 Claims**

1. A flameproofing composition comprising:

(a) a halogenated imide product by a process comprising: reacting hydrazine and a halogenated dicarboxylic acid anhydride in an aqueous medium at a temperature ranging from 40° to 225° C. with a molar ratio of anhydride/hydrazine equal to about 2 for a sufficient time to form the halogenated imide; and

(b) up to 80% by weight of a mixture of N-aminoimide and an anhydride of the dicarboxylic acid of the imide.

4,894,188

PROCESS FOR PRODUCING FATTY ACIDS AND THEIR ESTER DERIVATIVES

Takehiko Takahashi; Makoto Takagawa; Tomiyoshi Furuta, all of Niigata; Toshio Hidaka, Hiratsuka, and Kazuo Takada, Niigata, all of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

Continuation of Ser. No. 507,912, Jun. 27, 1983, abandoned, which is a continuation of Ser. No. 258,529, Apr. 28, 1981, abandoned. This application Feb. 13, 1985, Ser. No. 700,347

Claims priority, application Japan, Jun. 23, 1980, 65-84916

Int. Cl.[4] C07C *67/36, 67/37, 67/38, 51/12, 51/14*

U.S. Cl. 260—410.9 R **11 Claims**

1. In a process for producing fatty acids and their esters which comprises reacting an olefin, carbon monoxide and water in the presence of a hydrogen fluoride catalyst, or reacting an alcohol or its ether and carbon monoxide in the presence of a hydrogen fluoride catalyst containing water, and thermally decomposing the resulting reaction product containing water, the improvement comprising conducting the thermal decomposition under reflux of at least one hydrocarbon or halogenated hydrocarbon having a boiling point lower than the reaction product and being selected from the group consisting of aliphatic hydrocarbons having 2–6 carbon atoms, halogenated aliphatic hydrocarbons having 2–6 carbon atoms, aromatic hydrocarbons having 6–8 carbon atoms and halogenated aromatic hydrocarbons having 6–8 carbon atoms, whereby the reaction product of fatty acid or its ester has 0.05 or less mole of fluorine per mole of fatty acid or its ester.

4,894,189

PROCESS FOR THE PRODUCTION OF SPHERICAL PARTICLES

Dilip Dave, Twickenham; Andrew Holt, Camberley, and Timothy K. McNiff, Weybridge, all of England, assignors to The British Petroleum Company p.l.c., London, England

Filed Apr. 28, 1988, Ser. No. 187,483

Claims priority, application United Kingdom, May 9, 1987, 8711005

Int. Cl.[4] B29B *9/08, 9/16*

U.S. Cl. 264—15 **7 Claims**

1. A method for making spherical particles having a diameter in the range from 10 to 1000 microns suitable for use in fixed, moving, or mobile catalyst beds, which comprise:

(a) kneading powdered raw material selected from oxides, borides, nitrides, carbides and fluorides of aluminum, silicon, magnesium, titanium, mixtures thereof and chemical combination thereof, liquid in the amount of 5 to 65% v/w on powder, and wax in the amount of 2 to 10% w/w, to form a dough/agglomerated granules,

(b) separating the dough/agglomerated granules to a predetermined size fraction without extruding, and

(c) spheridizing the granules in a rotating bowl heated to a temperature of from 25° to 100° C.

4,894,190

STAGED PULTRUSION MOLDING OF COMPOSITES

Robert V. Kromrey, Campbell, Calif., assignor to United Technologies Corporation, Hartford, Conn.

Filed Sep. 26, 1988, Ser. No. 248,673

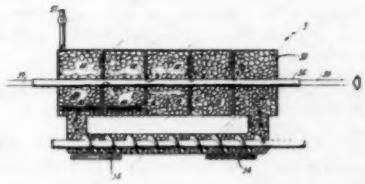
Int. Cl.[4] B29C *35/10*

U.S. Cl. 264—22 **5 Claims**

1. A method of molding a composite comprising:

(a) substantially filling a pressure chamber with a solid flowable polymer, said pressure chamber having a series of subchambers separated by a series of spaced apart baffles, said subchambers connected through baffle openings in said baffles;

(b) displacing said solid flowable polymer through a tube, said tube connecting at least two subchambers, a transferring subchamber and a receiving subchamber, said displacement causing said receiving subchamber to have a higher pressure than said transferring subchamber and said displacement producing a polymer flow in said chamber through said baffle openings from said high pressure receiving subchamber to said low pressure transferring subchamber; and



(c) passing a composite precursor through said pressure chamber by entering said precursor through said low pressure chamber wherein said composite precursor is exposed to pressure caused by the solid flowable polymer in order to cure the composite.

4,894,191

PREPARATION OF POLYOLEFIN FOAMS

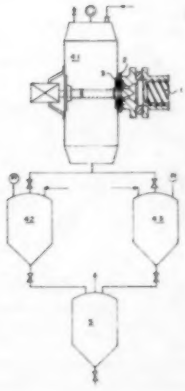
Hermann Tatzel, Hirschberg; Ludwig Zoern, Bad Duerkheim; Hans D. Zettler, Gruenstadt; Wolfgang Schneider, Heidelberg, and Gerhard Dembek, Bad Duerkheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Mar. 4, 1988, Ser. No. 164,491

Claims priority, application Fed. Rep. of Germany, Mar. 14, 1987, 3708291

Int. Cl.[4] C08J *9/22*

U.S. Cl. 264—53 **6 Claims**



1. A process for the preparation of a polyolefin foam having a density of from 30 to 300 g/l which comprises extruding through a die a homogeneous mixture of a polyolefin and from 10 to 50% by weight, based on the polyolefin, of a volatile blowing agent, with or without conventional additives, the said mixture being 10–50° C. below the DSC maximum of the polyolefin and under a pressure higher than the vapor pressure of the blowing agent at this temperature, wherein said mixture is extruded through said die into a chamber pressurized from 0.1 to 10 bar gage to form a foam and said foam is maintained at this pressure until it has cooled to a temperature which is at least 20° C. below the expansion temperature, thereafter said

foam is let down to atmospheric pressure, such that a polyolefin foam having a density of from 30 to 300 g/l. is produced.

4,894,192

PROCESS FOR PRODUCING MOLDED BODIES FROM PAPER AND A THERMOPLASTIC MATERIAL

Hans Warych, Birkenkamp 23, 4650 Gelsenkirchen, Fed. Rep. of Germany

Filed Aug. 2, 1988, Ser. No. 227,206
Claims priority, application Fed. Rep. of Germany, Aug. 5, 1987, 3725965
Int. Cl.[4] B29C *35/02, 47/00, 47/78*
U.S. Cl. 264—68 14 Claims

1. A process for producing a molded body from paper and a thermoplastic material, comprising the steps of:

collecting scrap material, comprising paper coated with a thermoplastic material uponn at least one side thereof, wherein the quotient ratio defined between the base weight of said paper with respect to the base weight of said thermoplastic material coated thereon is within the range of 1.0–6.5;

shredding said scrap material comprising said paper and said thermoplastic material coated thereon into shreds;

introducing said shreds into a screw extruder so as to melt said thermoplastic material and form an extrudable mixture; and

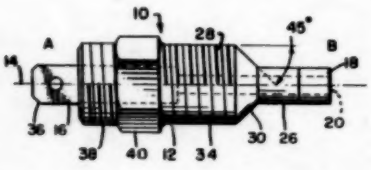
forming said mixture of molten thermoplastic material and paper shreds into a molded body.

4,894,193

METHOD OF FORMING A HIGH-TEMPERATURE-FLUID SENSOR

F. William Capp, Winston-Salem; Don J. Gerhardt, Clemmons, and Randal A. Little, Mocksville, all of N.C., assignors to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Sep. 26, 1988, Ser. No. 249,023
Int. Cl.[4] B29C *45/14*
U.S. Cl. 264—104 14 Claims



1. A method of forming an high-temperature-fluid sensor with a fusible detector, comprising the steps of:

providing a pair of elongate, electrical conductors;

providing a mold;

holding the conductors in a spaced-apart and substantially parallel, juxaposed disposition in said mold;

introducing polymer into the mold and forming a polymer body (a) about intermediate portions of said conductors, and (b) between said portions of said conductors; wherein said introducing step comprises introducing polymer between juxtaposed, terminal ends of said conductors, at one, common end thereof and forming thereat an electrically inert buffer between said ends;

depositing electrically conductive fusible material on and about said terminal ends of said conductors, and about said buffer to electrically bridge between said terminal ends; and

forming said buffer with a surface discontinuity for lockingly engaging said fusible material therewith, prior to performing the fusible material depositing step.

4,894,194

METHOD FOR MOLDING CERAMIC POWDERS

Mark A. Janney, Knoxville, Tenn., assignor to Martin Marietta Energy Systems, Inc., Oak Ridge, Tenn.

Filed Feb. 22, 1988, Ser. No. 158,485
Int. Cl.[4] C04B *38/06*
U.S. Cl. 264—109 6 Claims

1. A method for molding ceramic powders, comprising:

(a) forming a slurry mixture comprising ceramic powder, a dispersant for said ceramic powder, and a monomer solution consisting essentially of trimethylol propane triacrylate monomer, hexane-dioldiacrylate monomer, a free-radical initiator compound and an organic solvent;

(b) transferring said slurry mixture into a mold;

(c) heating said mold containing said slurry mixture at a temperature of about 100° to 120° C. for at least 5 minutes to cause said monomers to polymerize and crosslink to form a firm polymer-solvent gel matrix, whereby said slurry mixture is formed into a solid, shaped product;

(d) removing said solid, shaped product from said mold;

(e) heating said solid, shaped product at a temperature greater than about 130° C. for about 2 to 6 hours to substantially remove said organic solvent from said product; and

(f) further heating said solid, shaped product at a temperature greater than about 500° C. for a time sufficient to substantially remove said polymer from said product.

4,894,195

PROCESS FOR THE PREPARATION OF COATED LARGE DIAMETER ORIENTED MONOFILAMENTS

Teh-Chuan Wang, Parkersburg, W. Va., assignor to E. I. DuPont De Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 18,385, Feb. 25, 1987, Pat. No. 4,839,132. This application Jun. 27, 1988, Ser. No. 212,299
Int. Cl.[4] D01F *8/04*
U.S. Cl. 264—134 8 Claims

1. A process for the preparation of oriented monofilaments of semi-crystalline linear condensation polymer having improved resistance to delamination, which process comprises

(a) melt extruding a core of semi-crystalline linear condensation polymer,

(b) quenching the core to solidify the polymer in a substantially void-free condition;

(c) coating the core with additional molten semi-crystalline linear condensation polymer in a round configuration in an amount sufficient to increase the diameter of the core by about from 10 to 100 mils,

(d) quenching the resulting structure to solidify it in a substantially void-free condition,

(e) orienting the structure by drawing at least about 3.5 times its original length within the orientation temperature range of the polymer to provide an oriented filament having a diameter of at least about 60 mils, and

(f) coating the resulting oriented structure with about from 10 to 100 mils of polymeric material.

4,894,196

METHOD AND APPARATUS FOR LONGITUDINAL COMPRESSIVE TREATMENT OF WEBS

Richard R. Walton, Boston, Mass., and George E. Munchbach, Roslindale, Mass., assignors to Richard R. Walton, Boston, Mass.

Continuation of Ser. No. 803,059, Nov. 15, 1985, abandoned, which is a continuation-in-part of Ser. No. 594,670, Mar. 29, 1984, abandoned. This application Sep. 19, 1988, Ser. No. 246,917
Int. Cl.[4] B29C *53/28;* D06C *21/00*
U.S. Cl. 264—282 12 Claims

1. A machine for microcreping a running length of web comprising

a driven roll,

a stationary primary pressing surface for pressing the web against the surface of said roll to drive the web forward at a drive nip, and

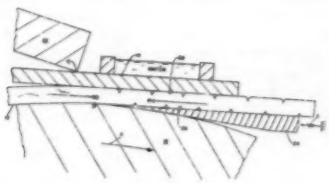
first and second generally stationary downstream web-contacting surfaces on sides of the web corresponding to said roll and primary surface, respectively, adapted to define an extrusion orifice to provide an extrusion retarding effect to the oncoming web, said second generally stationary downstream web-contacting surface being an extension of said stationary primary pressing surface,

the driving and retarding of said web being adapted to cause its longitudinal compressive treatment in a cavity defined in the region of transition of the web from said roll to said downstream surfaces,

that improvement wherein:

the machine is adapted to treat the web in response to retarding forces produced by tangential extrusion,

said first and second generally stationary downstream web-contacting surfaces defining an extrusion orifice (TEO) the axis X of which extends at an angle substantially parallel, i.e., at an angle less than 20°, to the tangent to the roll at the final point P of positive drive of the web, the extrusion resistance force R provided solely by the surfaces defining said orifice, serving to maintain a substantially straight retarded column of treated web material capable of resisting forward movement of material freshly driven by said roll, to cause said longitudinal compressive treatment of the web, said first web-contacting surface being defined by a generally plate-form blade member, said plate-form member being resiliently urged toward the driven nip by a force acting generally parallel to the tangent to the roll in the manner to enable resilient self adjusting movement of said plate member in its plane in response to operating conditions of said machine.



12. A method for microcreping a running length of web comprising pressing the web between the surface of a driven roll and a stationary primary pressing surface to drive the web forward at a drive nip, and

providing an extrusion retarding effect to the oncoming web by employing first and second generally stationary web-contacting surfaces on sides of the web corresponding to said roll surface and primary surface, respectively,

the driving and retarding of said web causing its longitudinal compressive treatment in a cavity defined in the region of transition of the web from said roll to said downstream surfaces,

that improvement wherein:

the web is treated by an extrusion resistance force formed solely by tangential extrusion between web-contacting surfaces comprising first and second generally stationary surfaces that define an extrusion orifice the axis of which extends substantially parallel, i.e., at an angle less than 20°, to the tangent to the roll at the final point P of positive drive of the web to maintain a substantially straight retarded column of treated web material capable of resisting forward movement of material freshly driven by said roll,

the extrusion retarding effect is resiliently maintained by providing a plate-form member to provide said first web-contacting surface, and resiliently urging said plate-form member toward the drive nip by a force acting generally parallel to the tangent to the roll in the manner to enable resilient self-adjusting movement of said plate-form member in the direction of its plane in response to operating conditions of said process.

4,894,197

METHOD FOR RUNNERLESS INJECTION MOLDING SYNTHETIC RESIN BY INTERMITTENT COOLING SYSTEM AND APPARATUS THEREOF

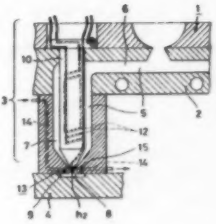
Shigeru Tsutsumi, Tokyo, Japan, assignor to Sanri Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 23, 1988, Ser. No. 172,717

Claims priority, application Japan, Mar. 26, 1987, 62-70414

Int. Cl.[4] B29C *45/72*

U.S. Cl. 264—297.2 **6 Claims**



1. A method for runnerless injection molding of a synthetic resin which comprises injecting a molten resin from a runner through a gate into a cavity in a mold-compacting state using injection means, removing the molded product in the cavity in a mold-separating state after cooling and solidification of the resin, and returning the cavity to a mold-compacting state thereby repeatedly and continuously performing the injection molding operation using the injection means, wherein the molten resin is continuously heated by a first heater heating separately the runner and by a second heater heating constantly only the gate, while said resin is intermittently cooled and solidified in the gate only using a cooling medium during every injection molding operation while said gate is constantly heated by said second heater.

4,894,198

PROCESS FOR PRODUCING HOLLOW BODIES OF ORIENTED THERMOPLASTIC MATERIAL

Peter Albrecht, Hamburg; Karl-Heinz Balkau, Oststeinbek; Vinco Cujic, Hamburg; Tilman Döring, Hamburg; Claus Horwege, Hamburg; Wolfgang Reymann, Hamburg; Klaus Vogel, Barbüttel, and Walter Wiedenfeld, Hamburg, all of Fed. Rep. of Germany, assignors to Krupp Corpoplast, Hamburg, Fed. Rep. of Germany

Filed Dec. 4, 1987, Ser. No. 129,025

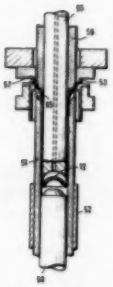
Claims priority, application Fed. Rep. of Germany, Feb. 25, 1987, 3705947

Int. Cl.[4] B29C *55/22, 57/00, 53/08, 49/64*

U.S. Cl. 264—521 **11 Claims**

1. A process for producing a hollow body of oriented thermoplastic material comprising a wall portion having first and second ends, an opening at the first end and a bottom at the second end, from a hollow blank comprising a substantially cylindrical wall having first and second ends, an opening at said first end and a bottom portion at said second end thereof, wherein the first end portion of said wall of the blank which has said opening is subjected to a pre-expansion operation, the pre-expanded end portion is clamped, and thereafter a heating mandrel is introduced into said blank through said opening of said blank by a relative movement between said heating mandrel and said blank, said mandrel bearing against the wall of said blank and being operative to heat at least the wall of said blank to the temperature required for thermo-fixing of at least said wall and wherein said pre-expanded blank is firstly cen-

tered and held between an axially displaceable holding mandrel introduced into said blank through said opening thereof until it comes to bear against said bottom portion thereof and an axially displaceable bottom mandrel which is caused to bear against the outside of said bottom portion, a support sleeve which is disposed around said bottom mandrel and whose inside diameter substantially corresponds to the outside diameter of said blank in the non-pre-expanded region thereof is thereupon displaced upwardly into a position just below said pre-expanded end portion of said blank, a first movable clamping ring which is disposed in coaxial relationship with said support sleeve is displaced axially upwardly to clamp said pre-expanded end portion of said blank between said movable clamping ring and a second clamping ring which surrounds said holding mandrel, said heating mandrel which is arranged in coaxial relationship with said holding mandrel and axially displaceably with respect thereto is then introduced through said opening into said blank, said heating mandrel which bears with its outside surface against the inside surface of said wall of



said blank being introduced into said blank which is held by said first and second clamping rings, by a relative movement between said mandrel and said blank, at the same time said support sleeve is displaced downwardly substantially synchronously with the downward movement of said heating mandrel until said heating mandrel has reached an end position in which it is towards said bottom portion of said blank, after a residence time of said heating mandrel which is sufficient to cause thermofixing of said blank a cooling sleeve which is arranged in coaxial relationship with the support sleeve and the bottom mandrel and which is of an inside diameter slightly larger than the outside diameter of the blank which has been heated by said heating mandrel and at least slightly expanded is pushed axially upwardly over said blank, and thereupon a pressure medium is introduced into said blank whereby the wall portion of said blank is lifted off said heating mandrel and pressed with its outside peripheral surface against said cooling sleeve and cooled thereby until it attains a condition of adequate stability in respect of shape.

4,894,199

BEAM FUSION DEVICE AND METHOD

Norman Rostoker, 18 Aspen Tree La., Irvine, Calif. 92715

Continuation-in-part of Ser. No. 872,888, Jun. 11, 1986, abandoned. This application Jun. 11, 1987, Ser. No. 51,899

Int. Cl.[4] G21B 1/00

U.S. Cl. 376—107 **25 Claims**

1. A fusion device wherein atomic nuclei react to generate reaction products with kinetic energies convertible to useful energy, said device comprising

wall means defining and confining a reaction chamber,

means for generating a substantially constant unidirectional magnetic field of predetermined strength in at least a portion of said reaction chamber,

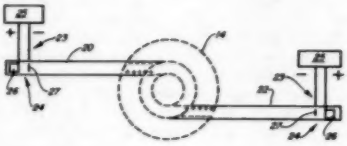
first and second source means for providing respective first and second positive hot ions at temperatures in a range where said first and second positive hot ions have substantially optimum cross sections for their mutual fusion reaction to generate said reaction products,

first and second means for accelerating said first and second positive hot ions, respectively, to predetermined velocities,

means for neutralizing said accelerated positive hot first and second positive ions by electrons,

means for directing said first and second positive hot ions neutralized by electrons into said portion of said reaction chamber substantially orthogonally of said magnetic field utilizing self-polarization, and

means for draining the polarization of said neutralized and



polarized first and second positive hot ions to separate the neutralizing electrons from the respective first and second positive hot ions, the predetermined strength of the magnetic field and the predetermined velocities to which said first and second positive hot ions are accelerated being such as to provide centripetal force on the respective separated first and second positive hot ions to confine the ions to respective orbits within said portion of said reaction chamber, and the directions and relative ions being such as to make the respective said orbits for said first and second positive hot ions substantially coextensive, with the first and second positive hot ions moving in substantially the same direction at substantially the same mean velocity.

4,894,200

METHOD OF OPERATING A NUCLEAR REACTOR

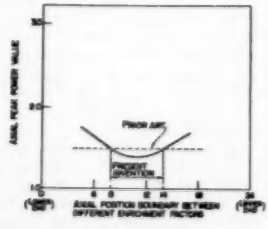
Junichi Yamashita, Hitachi, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Division of Ser. No. 915,580, Jun. 15, 1978. This application Nov. 18, 1983, Ser. No. 553,232

Claims priority, application Japan, Jun. 20, 1977, 52-73693

Int. Cl.[4] G21C 7/06

U.S. Cl. 376—237 **15 Claims**



1. A method of operating a nuclear reactor having a core construction in the form of an array of a plurality of fuel assemblies, each fuel assembly including a plurality of fuel rods and being divided into two sections along the length of each fuel assembly to form an upper section and a lower section, the lower section having a smaller mean infinite multiplication factor than the upper section, predetermined ones of the fuel assemblies having an overall mean infinite multiplication factor

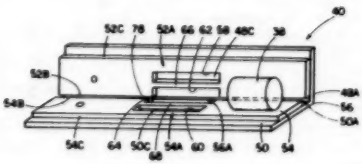
smaller than the others of the fuel assemblies, the method of operating comprising the steps of providing a plurality of control rods wherein a respective control rod is adapted to be inserted between selected ones of the fuel assemblies, positioning selected ones of the control rods to be utilized for power adjustment to be adjacent the predetermined ones of the fuel assemblies having the overall mean infinite multiplication factor smaller than the other fuel assemblies when inserted in the core, inserting the power adjusting control rods in the core, positioning the other control rods to be utilized as reactor shutdown control rods to be adjacent the other of the fuel assemblies when inserted in the core, maintaining the reactor shutdown control rods withdrawn from the core, adjusting reactor power by at least partially withdrawing at least a selected one of the power adjusting control rods from the core during normal power operation of the reactor, and shutting down the reactor when desired by inserting the reactor shutdown control rods into the core, wherein the step of adjusting reactor power includes varying the insertion position of the power adjusting control rods to increase reactor power during normal power operation of the reactor without reducing reactor power prior to varying of the insertion position of the reactor power adjusting control rods.

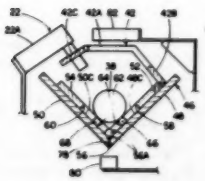
4,894,201

NUCLEAR FUEL PELLET SURFACE DEFECT INSPECTION APPARATUS

Hassan J. Ahmed, Columbia, S.C., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 27, 1988, Ser. No. 199,735
Int. Cl.[4] G21C *19/00*
U.S. Cl. 376—261 **13 Claims**





1. In an apparatus for inspecting nuclear fuel pellets for surface defects, the combination comprising:

(a) an inspection chamber;

(b) a pellet guide chute assembly extending through said inspection chamber and including

(i) a support substrate composed of a pair of elongated wall sections rigidly attached together to have a generally V-shaped configuration in cross section, and

(ii) a pair of elongated plates attached on respective upper adjacent sides of said support substrate wall sections for supporting a nuclear fuel pellet between and on adjacent longitudinal portions of said plates located in said inspection chamber,

(iii) said plates having aperture means underlying the pellet at said adjacent longitudinal portions of said plates which expose portions of said support substrate wall sections also underlying the pellet such that acoustical energy can be propagated to and from bottom and side portions of the pellet adjacent said adjacent longitudinal portions of said plates via reflection of the acoustical energy from said exposed support substrate wall section portions;

(c) an acoustical energy reflecting cover disposed over said guide chute assembly at said inspection chamber; and

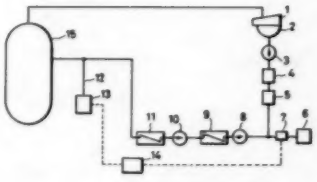
(d) means for transmitting and receiving acoustical energy into and from said inspection chamber for propagating such energy to and from the pellet therein.

4,894,202

METHOD OF INHIBITING RADIOACTIVE SUBSTANCES FROM ELUTING INTO COOLING WATER IN A NUCLEAR PLANT AND AN APPARATUS THEREFOR

Makoto Nagase, Hitachi; Yamato Asakura, Katsuta; Hidetoshi Karasawa, Katsuta; Masaharu Sakagami, Katsuta; Shunsuke Uchida, Hitachi; Toshio Sawa, Hitachi, and Katsumi Ohsumi, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 2, 1987, Ser. No. 103,705
Claims priority, application Japan, Oct. 3, 1986, 61-234641
Int. Cl.[4] G21C *1/01*
U.S. Cl. 376—306 **13 Claims**



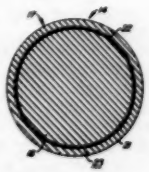
1. A method of inhibiting radioactive substances from eluting into the cooling water in a nuclear plant, wherein, after a new fuel cladding is loaded into a nuclear reactor, a source of iron ions is injected into the cooling water, during nuclear heating, in order to form an iron oxide layer on a surface of the new fuel cladding with a covering ratio of 100%; and, after said iron oxide layer has been formed on said surface of the new fuel cladding, an amount of said source of iron ions injected into the cooling water is decreased so that a Fe/Ni molar concentration ratio in the cooling water is set in a range of from about 2 to 10.

4,894,203

NUCLEAR FUEL ELEMENT HAVING OXIDATION RESISTANT CLADDING

Ronald B. Adamson, Fremont, Calif., assignor to General Electric Company, San Jose, Calif.

Filed Feb. 5, 1988, Ser. No. 152,507
Int. Cl.[4] G21C *3/00*
U.S. Cl. 376—416 **10 Claims**



1. An improved nuclear fuel element of the type including a zirconium alloy tube, a zirconium barrier layer metallurgically

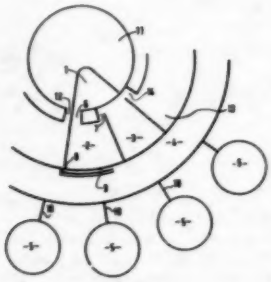
bonded to the inside surface of the alloy tube, and a central core of nuclear fuel material partially filling the inside of said tube so as to leave a gap between said sponge zirconium barrier and said nuclear fuel material, said improvement comprising an alloy layer formed on the inside surface of the zirconium barrier layer, said alloy layer being composed of one or more impurities present in a thin layer region of the zirconium barrier in amounts less than 1% by weight but sufficient to inhibit the oxidation of said inside surface of the zirconium barrier layer without substantially affecting the plastic properties of said barrier layer, wherein said impurities are selected from the group consisting of iron, chromium, copper, nitrogen, and niobium.

4,894,204

ROTOR WITH DYNAMIC PIPETING FOR A CENTRIFUGE ANALYSIS DEVICE

Bruno Corsut, Pau, France, assignor to Inovelf, Courbevoie, France

Continuation of Ser. No. 149,530, Jan. 28, 1988, abandoned, which is a continuation of Ser. No. 810,601, Dec. 19, 1985, abandoned. This application Dec. 9, 1988, Ser. No. 282,855
Claims priority, application France, Dec. 21, 1984, 84 19617
Int. Cl.[4] G01N *21/07*
U.S. Cl. 422—72 **8 Claims**



1. A rotor of a centrifuge analysis device, the rotor having a center and a periphery which rotor comprises from the center of the periphery thereof:

(1) central receptacles for liquids to be diluted before analysis,

(2) calibration vessels and overflow vessels disposed circumferentially adjacent to each other in respect to a circle concentric with the rotor, the calibration and overflow vessels thereby being spaced at substantially the same distance from the center of the rotor, and wherein each calibration vessel is provided with

(i) a feed orifice through which it communicates with one of the central receptacles,

(ii) an exit orifice located in the wall of said calibration vessel opposite the feed orifice and permanently open, and

(iii) an overflow orifice located at a position between said feed and exit orifices and through which the calibration vessel is connected to one of the overflow vessels, the exit orifice of said calibration vessel having a cross sectional area much smaller as compared to that of the feed and overflow orifices that during the time taken to fill the calibration vessel practically no fluid escapes from said exit orifice,

(3) a mixing vessel communicating with each calibration vessel through the exit orifice of said calibration vessel, and

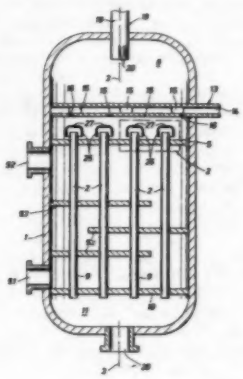
(4) a plurality of measuring cells, each connected to the mixing vessel through a duct.

4,894,205

MULTITUBE REACTOR

David Westerman, and Franciscus J. M. Schrauwen, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Sep. 14, 1988, Ser. No. 244,234
Claims priority, application United Kingdom, Sep. 18, 1987, 8721964
Int. Cl.[4] B01J *8/06*
U.S. Cl. 422—197 **6 Claims**



1. A multitube reactor for carrying out a process for catalytic conversion, comprising:

a normally substantially vertically extending vessel having:

an inner wall;

a central longitudinal axis;

a fluid inlet chamber disposed in the upper interior part of said vessel;

liquid supply means for supplying liquid to said fluid inlet chamber and capable of being connected to supply of liquid;

gas supply means for supplying gas to said fluid inlet chamber and capable of being connected to a supply of gas;

an effluent collecting chamber disposed in the lower part of said vessel;

outlet means in fluid communication with said effluent collecting chamber for passing reaction effluent from said vessel;

an upper tube plate disposed in the upper part of said vessel below said fluid inlet chamber, and supported by the inner wall of said vessel;

a lower tube plate disposed in the lower part of said vessel above said effluent collection chamber and supported by the inner wall of said vessel;

a plurality of open-ended reactor tubes disposed within said vessel and parallel to its longitudinal axis for holding catalyst particles, said reactor tubes being fixed to said upper tube plate and having upper ends extending above said upper tube plate and communicating with said fluid inlet chamber, said reactor tubes having lower ends fixed to said lower tube plate, and communicating with said effluent collecting chamber; and

a plurality of gas and liquid supply devices, each of said gas and liquid supply devices being disposed above the upper end of a reactor tube of said plurality of reactor tubes, each said gas and liquid supply device comprising:

a generally arcuate cap having a lower skirt extending around the uppermost portion of the upper end of said reactor tube and spaced apart from said tube thereby providing a generally annular inlet for liquid to flow from said fluid inlet chamber below said skirt to the open upper end of said reactor tube, said cap further

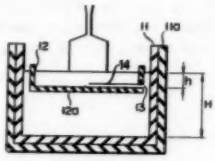
having in its upper part an aperture for admitting gas from said fluid inlet chamber to said reactor tube, said aperture having a diameter in the range from 2 to 30% of the inner diameter of said reactor tube.

4,894,206

CRYSTAL PULLING APPARATUS

Youji Yamashita, Yokohama; Masakatu Kojima, Yokosuka; Yoshiaki Matsushita, Kawasaki, and Masanobu Ogino, Yokosuka, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 1, 1987, Ser. No. 91,947
Claims priority, application Japan, Sep. 22, 1986, 61-221896
Int. Cl.[4] C30B *15/30*
U.S. Cl. 422—249 **22 Claims**



1. A crystal pulling apparatus comprising:
an outer crucible for containing an undoped melt;
an inner crucible, arranged concentrically and integrally with said outer crucible, containing a melt doped with an impurity, and having a diameter $\sqrt{k}$ times that of said outer crucible, when a segregation coefficient of the impurity if k;
a through hole formed in said inner crucible; and
melt supply means, one end of which is located in said through hole and an other end of which is located in the melt contained in said outer crucible, for supplying the melt contained in said outer crucible into said inner crucible during crystal pulling, for preventing diffusion of the doping impurity between the melt in said outer crucible and that in said inner crucible, and for preventing exchange of the melt between said outer crucible and said inner crucible before the forming of a crown, said melt supply means being a passage having a length equal to or greater than a diffusion constant $\sqrt{2DT}$, where D is the diffusion coefficient of the doping impurity in the melt and T is the time interval from the dissolving of the doping impurity into the melt until the end of neckdown.

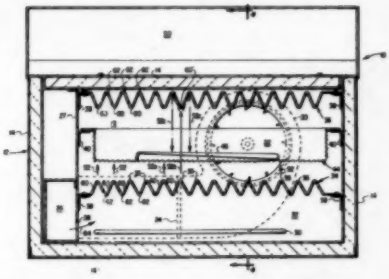
4,894,207

RECIRCULATING HIGH VELOCITY HOT AIR STERILIZING DEVICE

Virgil L. Archer, and M. Keith Cox, both of Dallas, Tex., assignors to Archer Aire Industries, Inc., Dallas, Tex.

Continuation of Ser. No. 44,909, Apr. 30, 1987, abandoned, which is a continuation-in-part of Ser. No. 915,116, Oct. 3, 1986, abandoned. This application Feb. 10, 1989, Ser. No. 310,031
Int. Cl.[4] A61L *2/00, 2/04, 2/06*
U.S. Cl. 422—292 **23 Claims**

1. A recirculation hot air impingement device for sterilizing medical and dental instruments or the like, comprising:
a housing having a sterilizing chamber therein;
nonplanar air supply wall means, extending continuously across said sterilizing chamber and having formed therethrough a mutually spaced series of jet-forming supply openings, for utilizing pressurized air from a source thereof to create in said chamber a spaced series of impingement air jets having a predetermined velocity;
air deflector wall means, extending across said chamber in a spaced, generally parallel, opposing relationship with said air supply wall means, for intercepting and rearwardly deflecting said impingement air jets;
heated air recirculating means, including blower means and air heating means, for creating within said sterilizing chamber a recirculating flow of air which is heated to a predetermined sterilizing temperature and is sequentially flowed through said supply openings toward said air deflector wall means, deflected therefrom toward said air supply wall means, and then flowed again through said supply openings toward said air deflector wall means, and
support means for supporting an object to be sterilized in a stationary position within said chamber generally centrally between and spaced apart from each of said air supply wall means and said air deflection wall means in a manner such that the stationary object is positioned to be impinged by both heated air discharged from said supply openings and heated air deflected from said air deflector wall means to thereby be continuously enveloped by a turbulent layer of heated air,



said heated air recirculating means including return means for drawing air from said turbulent layer across the object in a direction generally transverse to said impingement jets, and then flowing the air outwardly from said chamber.

4,894,208

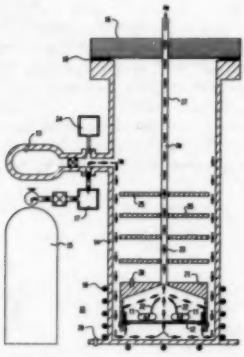
SYSTEM FOR SEPARATING RADIOACTIVE NA FROM AL

Henry C. Griffin, Ann Arbor, and Thomas D. Steiger, Saline, both of Mich., assignors to The University of Michigan, Ann Arbor, Mich.

Filed Jul. 14, 1988, Ser. No. 219,092
Int. Cl.[4] C22B *26/10*
U.S. Cl. 423—2 **5 Claims**

1. A method of separating and collecting radioactive sodium from aluminum, the method comprising the steps of:
heating the aluminum to a melting temperature for releasing the sodium therein as a vapor;
first subjecting the radioactive sodium separated from the aluminum to a draft of an inert gas;
transporting the radioactive sodium in the inert gas into an exhaust tube; and

second subjecting the exhaust tube to a thermal gradient whereby as the inert gas passes through a cooled region of



the exhaust tube the radioactive sodium therein is plated to the interior of the exhaust tube.

4,894,209

PROCESS FOR OBTAINING A URANIUM-BEARING CONCENTRATE OF HIGH PURITY FROM LIQUORS CONTAMINATED WITH ZIRCONIUM

Jacques M. M. Moret, Saint Pardoux; Nicole Peyriere, Limoges, and Andre L. N. Textoris, Bessines, all of France, assignors to Compagnie Generale des Matieres Nucleaires, Velizy-Villacoublay, France

Continuation-in-part of Ser. No. 762,006, Aug. 2, 1985, abandoned. This application Jun. 18, 1987, Ser. No. 63,370

Claims priority, application France, Aug. 2, 1984, 84 12252

Int. Cl.[4] C01G *43/00*

U.S. Cl. 423—15 **21 Claims**

1. A process for selectively removing zirconium from an aqueous uranium-containing solution, in which the weight ratio of uranium to zirconium is at least about 25; said process comprising the step of:

providing said solution with a pH of 2.5 to 3 and heating said solution to a temperature of about 30° C. to 60° C., whereby zirconium selectively precipitates from said solution.

4,894,210

PURIFICATION OF A HYDROCARBON MIXTURE

Patrick J. Denny, County Durham; Alan E. Thomas, and Peter J. Carnell, both of Cleveland, all of England, assignors to Imperial Chemical Industries plc, London, England

Filed Jun. 20, 1986, Ser. No. 876,747

Claims priority, application United Kingdom, Jul. 9, 1985, 8517333

Int. Cl.[4] C01B *31/20*

U.S. Cl. 423—230 **4 Claims**

1. A continuous process for the desulphurisation of a raw gas stream containing methane in admixture with at least one higher boiling component selected from water and one or more hydrocarbons of higher molecular weight than methane, said raw gas stream having such a composition and being at such a temperature, in the range of −10° to +10° C., and pressure, in the range 10 to 200 bar abs., that the concentration of at least one of said higher boiling components is at least 90% of the concentration of said higher boiling component at which said raw gas stream would be saturated with said higher boiling component, comprising:

(a) heating an inlet gas stream consisting of said raw gas stream, or a major part thereof, to a temperature that is at least 10° C. above the dew point of said raw gas stream and is in the range 80° to 200° C. thereby producing a heated gas stream;

(b) contacting said heated gas stream with a bed of a particulate solid absorbent material comprising zinc oxide, thereby producing a desulphurised gas stream; and

(c) combusting a gas stream consisting of:

(i) part of the desulphurised gas stream, or

(ii) where said inlet gas stream is a major part of the raw gas stream, the remainder of the raw gas stream, or

(iii) a combination of (i) and (ii) thereby providing a heated combustion products stream; said heating step (a) being effected by:

heat exchanging the inlet gas stream with the desulphurised gas steam, thereby forming a partly heated inlet stream and a cooled desulphurised gas stream that has a temperature below 25° C. and that is at least 5° above the temperature of said raw gas stream; and

further heating said partly heated inlet stream by heat exchanging the partly heated gas stream with the heated combustion products stream.

4,894,211

PROCESS FOR THE PRODUCTION OF GRANULAR SODIUM PERBORATE MONOHYDRATE HAVING GOOD MECHANICAL STRENGTH

Antonino Condo', and Renzo Ferrario, both of Milan, Italy, assignors to Ausimont S.p.A., Milan, Italy

Filed May 15, 1986, Ser. No. 863,529

Claims priority, application Italy, May 16, 1985, 20744 A/85

Int. Cl.[4] C01B *15/12*

U.S. Cl. 423—266 **9 Claims**

1. A process for the manufacture of granular sodium perborate monohydrate, comprising the formation of a mixed composition consisting of sodium perborate tetrahydrate and sodium silicate, by adding sodium silicate, having an SiO_2/Na_2O molar ratio between 0.4 and 2.0, to sodium perborate tetrahydrate in motion and drying said mixed composition until sodium perborate monohydrate is obtained.

4,894,212

SYNTHESIS OF CRYSTALLINE SILICATE ZSM-11

John P. McWilliams, Woodbury, N.J., and Mae K. Rubin, Bala Cynwyd, Pa., assignors to Mobil Oil Corp., New York, N.Y.

Filed Jul. 20, 1987, Ser. No. 75,496

Int. Cl.[4] C01B *33/28*

U.S. Cl. 423—328 **11 Claims**

1. In a method for synthesizing a crystalline silicate having the structure of ZSM-11 exhibiting a characteristic X-ray diffraction pattern as shown in Table 1 of the specification, which comprises preparing a mixture capable of forming said silicate, said mixture comprising a source of alkali metal cations (M), a source of silicon and water, maintaining said mixture under sufficient conditions until crystals of said silicate are formed and recovering said crystalline silicate having the structure of ZSM-11, the improvement wheren said mixture further comprises octyalmine (R) and seed crystals of ZSM-11 structure, said mixture having a composition, in terms of mole ratios, within the following ranges:

SiO_2/Al_2O_3=40–2000

H_2O/SiO_2=5–50

OH^{-1}/SiO_2=0.05–0.5

M/SiO_2=0.05–0.5

R/SiO_2=0.03–1.0

said recovered crystalline silicate containing said R and M.

4,894,213

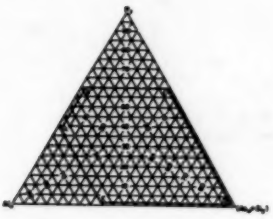
ARSENIC-ALUMINUM-PHOSPHORUS-SILICON-OXIDE MOLECULAR SIEVE COMPOSITIONS

Edith M. Flanigen, White Plains; Brent M. T. Lok, New City; Robert L. Patton, Katonah, and Stephen T. Wilson, Shrub Oak, all of N.Y., assignors to UOP, Des Plaines, Ill.

Continuation-in-part of Ser. No. 599,808, Apr. 13, 1984, abandoned. This application Mar. 31, 1986, Ser. No. 845,984

Int. Cl.[4] C01B *33/28*

U.S. Cl. 423—328 **28 Claims**



1. Crystalline molecular sieves comprising three-dimensional microporous framework structures of AsO_2, AlO_2, PO_2 and SiO_2tetrahedral units having an empirical chemical composition on an anhydrous basis expressed by the formula:

$$mR:(As_wAl_xP_ySi_z)O_2$$

wherein "R" represents at least one organic templating agent present in the intracrystalline pore system; "m" represents the molar amount of "R" present per mole of $(As_wAl_xP_ySi_z)O_2$ and has a value of zero to about 0.3; and "w", "x", "y" and "z" represent the mole fractions of arsenic, aluminum, phosphorus and silicon, respectively, present as tetrahedral oxides, said mole fractions being such that they are within the pentagonal compositional area defined by points A, B, C, D, and E of FIG. 1, said crystalline molecular sieves having a characteristic X-ray powder diffraction pattern which contains at least the d-spacings set forth in one of Tables C, F, K, M, P, T, V, W herein.

4,894,214

ZEOLITE L PREPARATION

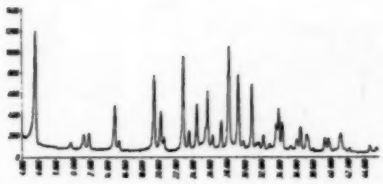
Johannes P. Verduijn, Spijkenisse, and Pieter E. Gellings, Oostvoorne, both of Netherlands, assignors to Exxon Research & Engineering Company, Florham Park, N.J.

Filed Feb. 25, 1988, Ser. No. 160,362

Claims priority, application United Kingdom, Feb. 25, 1987, 8704365; Jan. 4, 1988, 8800051

Int. Cl.[4] C01B *33/28*

U.S. Cl. 423—328 **6 Claims**



1. A process for the preparation of a zeolite L containing caesium in which said zeolite L is crystallised from a synthesis mixture with a molar composition (expressed as oxides) of:

K_2O/SiO_2: 0.15 to 0.40

K_2O/Cs_2O: 3 to 10

H_2O/K_2O: 40 to 100 and

SiO_2/Al_2O_3: 7 to 13

and containing at least 0.5 ppm (by weight) of divalent metal cations in an effective amount to obtain substantially only zeolite L by limiting the formation of pollucite, erionite and zeolite W.

4,894,215

PROCESS FOR PRODUCING POROUS MATERIALS OF CARBON

Takamasa Kawakubo, Tano; Mitsuru Yoshida, Fujioka, and Yoshihisa Suda, Maebashi, all of Japan, assignors to Mitsubishi Pencil Co., Ltd., Tokyo, Japan

Filed Jan. 7, 1988, Ser. No. 141,414

Int. Cl.[4] C01B *31/02*

U.S. Cl. 423—449 **9 Claims**

1. A process for producing porous materials of carbon, comprising:

introducing particles of an organic polymer in a vessel of an arbitrary shape, and

dissolving a particle surface layer to produce point bondings between the particles, thereby producing a porous organic polymer having continuous pores,

then insolubilizing or infusibilizing said porous organic polymer, and

further calcining said porous organic polymer in an inert gas atmosphere.

4,894,216

CATALYTIC PROCESS FOR PRODUCING SULPHUR FROM H_2S CONTAINING SOUR GAS

Georges Kvasnikoff, Monein; Jean Nougayrede, Pau, and André Philippe, Orthez, all of France, assignors to Société Nationale Elf Aquitaine (Production), Paris, France

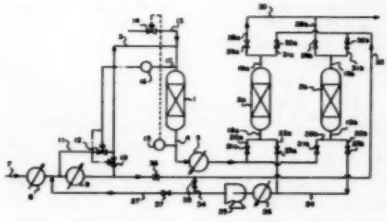
PCT No. PCT/FR86/00367, § 371 Date Jun. 25, 1987, § 102(e) Date Jun. 25, 1987, PCT Pub. No. WO87/02655, PCT Pub. Date May 7, 1987

PCT Filed Oct. 24, 1986, Ser. No. 75,746

Claims priority, application France, Oct. 25, 1985, 85 15904

Int. Cl.[4] C01B *17/04*

U.S. Cl. 423—574 R **31 Claims**



1. A catalytic process for producing sulphur from a sour gas containing H_2S in a concentration ranging from about 0.2 to about 20% by volume, which comprises:

(a) feeding a stream of said sour H_2S-containing gas which is substantially free of sulphur and SO_2 and splitting the sour gas into two portions, one portion being fed to the H_2S oxidation catalyst for partial oxidation of the H_2S within the sour gas and the other portion being fed to a sulphur-laden CLAUS catalyst for regeneration of the CLAUS catalyst, feeding the portion of sour gas for partial oxidation with a controlled and limited quantity of a gas containing free oxygen to a H_2S oxidation catalyst, partially oxidizing the H_2S to sulphur and SO_2, while operating at a temperature above 150° C. and producing a gaseous

effluent containing H_2S and SO_2 in a H_2S to SO_2 molar ratio of about 2:1 and elemental sulphur,

(b) cooling said gaseous effluent to a temperature lower than about 160° C.,

(c) contacting the cooled gaseous effluent from step (b) with the CLAUS catalyst at a sufficiently low temperature for the H_2S to react with SO_2 and forming sulphur which is deposited on the catalyst and forming a substantially desulphurated gaseous effluent stream,

(d) periodically regenerating the sulphur-laden CLAUS catalyst from step (c) by sweeping said catalyst with said other portion of the sour gas at a temperature between about 200° C. and 500° C., and recovering the sweeping gas after regeneration of the catalyst,

(e) cooling the regenerated CLAUS catalyst to a temperature below about 160° C. suitable for further contacting with the gaseous effluent from step (b), and

(f) recycling the H_2S-containing sweeping gas which is substantially free of sulphur and SO_2 recovered from the regeneration of the sulphur-laden CLAUS catalyst in step (d) and mixing the sweeping gas recovered from the regeneration of the sulphur-laden CLAUS catalyst in step (d) with the stream of sour gas, feeding one portion of the mixture of sweeping gas and sour gas to the H_2S oxidation catalyst for partial oxidation of the H_2S within the mixture and feeding the other portion of the mixture for regeneration of the sulphur-laden CLAUS catalyst.

4,894,217

PROCESS FOR CAUSTICIZING OF AN AQUEOUS SOLUTION CONTAINING ALKALI CARBONATE

Per H. Östman, Jorvas, Finland, assignor to Ekono Oy, Espoo, Finland

PCT No. PCT/FI86/00131, § 371 Date Oct. 13, 1987, § 102(e) Date Oct. 13, 1987, PCT Pub. No. WO87/03314, PCT Pub. Date Jun. 4, 1987

PCT Filed Nov. 21, 1986, Ser. No. 128,652

Claims priority, application Finland, Nov. 22, 1985, 854628

Int. Cl.[4] C01F *1/00*; C01D *3/06*; C01B *1/00*; D21C *9/00*

U.S. Cl. 423—659 **3 Claims**

1. A process for causticizing a raw aqueous alkali carbonate solution (41) with calcium hydroxide (15) by contacting the raw aqueous alkali carbonate solution (41) with the calcium hydroxide (15) and separating an alkali hydroxide solution (21) produced in the causticizing (C,D) from a calcium carbonate precipitate (24), characterized in that:

(a) an unused bed (16) of calcium hydroxide and calcium carbonate is at least partially formed by mixing calcium oxide (37) and calcium carbonate (36) with a part (18) of the alkali hydroxide solution (21) from a prior such causticizing (C);

(b) the raw aqueous alkali carbonate solution (41) is first led through a partially used bed (20) of calcium hydroxide and calcium carbonate to produce a partly causticized aqueous alkali carbonate solution (25), the partially used bed (20) having been formed when such a partly causticized aqueous alkali carbonate solution (25) was led through an unused bed (16) at a prior time, the carbonate molar quantity of the raw aqueous alkali carbonate solution (41) being greater than the total calcium hydroxide molar quantity of the partially used bed (20) before being led therethrough;

(c) the resulting partly causticized aqueous alkali carbonate solution (25) is led through the unused bed (16), through which an aqueous alkali carbonate solution has not previously been led, such that the alkali hydroxide solution (21) and a partially used bed (20) are formed; and

(d) an excess portion (22) of the alkali hydroxide solution (21) produced in the causticizing (C) is withdrawn.

4,894,218

THERAPY AGENTS, METHODS OF PREPARATION, AND METHODS OF USE

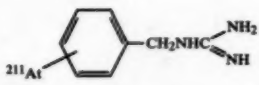
Barry L. Engelstad, Orinda; David L. White, Oakland, and John P. Huberty, Corte Maders, all of Calif., assignors to Regents of the University of California, Oakland, Calif.

Filed May 31, 1988, Ser. No. 200,476

Int. Cl.[4] A61K *43/00*; C07C *129/12*

U.S. Cl. 424—1.1 **4 Claims**

1. A compound having the formula



in which the position of the ^{211}At atom is a member selected from the group consisting of ortho-, meta- and para-.

4,894,219

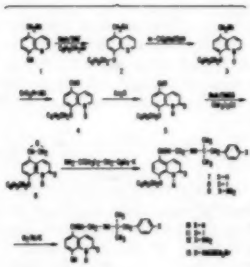
BETA-AGONIST CARBOSTYRIL DERIVATIVES, ASSAY METHOD AND PHARMACOLOGICAL COMPOSITION

Stephen P. Baker, Gainesville, Fla., and Josef Pitha, Baltimore, Md., assignors to University of Florida, Gainesville, Fla.

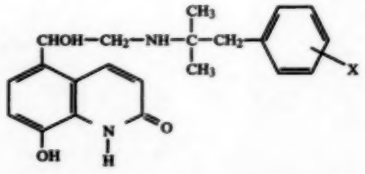
Filed Mar. 29, 1988, Ser. No. 174,874

Int. Cl.[4] A61K *49/00*, *31/47*; C07D *215/20*

U.S. Cl. 424—9 **9 Claims**



1. A compound having beta-adrenergic receptor agonist properties having the formula:



wherein X may be the ortho, meta or para position and is selected from the group consisting of halogen, amino and substituted and unsubstituted lower alkanoylamino having from 1 to 6 carbon atoms wherein said substituents are pharmaceutically acceptable and pharmaceutically acceptable salts and complexes thereof.

4,894,220

ANTIBACTERIAL ANTIPLAQUE ORAL COMPOSITION

Nuran Nabi, North Brunswick, and Abdul Gaffar, Princeton, both of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Continuation-in-part of Ser. No. 8,901, Jan. 30, 1987. This application Dec. 29, 1988, Ser. No. 291,712

Int. Cl.[4] A61K 7/16, 7/18, 7/22

U.S. Cl. 424—52 18 Claims

1. An oral composition comprising in an orally acceptable vehicle, a water-humectant phase, said water and humectant comprising at least about 10% by weight of said oral composition, an efective antiplaque amount of a substantially water insoluble noncationic antibacterial agent selected from the group consisting of halogenated diphenyl ethers and about 0.0005–4% by weight of a systematic anionic linear polymeric polycarboxylate having a molecular weight of about 1,000 to about 1,000,000, wherein said humectant includes a solubilizing agent selected from the group consisting of propylene glycol, dipropylene glycol, methyl cellosolve, ethyl cellosolve, olive oil, castor oil, amyl acetate, ethyl acetate, glyceryl tristearate and benzyl benzoate mixed with at least one of glycerine and sorbitol, the amount of said solubilizing humectant being sufficient to dissolve said antibacterial agent.

4,894,221

METHOD OF TREATING PLAQUE USING MORPHOLINE COMPOUNDS

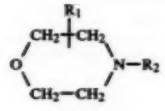
Sven E. H. Hernestam; Nils A. Nilsson, and Willard Lars-Olof, all of Malmo, Sweden, assignors to AB Ferrosan, Malmo, Sweden

Continuation-in-part of Ser. No. 245,441, Mar. 19, 1981, abandoned. This application Mar. 30, 1983, Ser. No. 480,399

Int. Cl.[4] A61K 7/22

U.S. Cl. 424—54 2 Claims

1. Method of keeping the oral cavity and the surfaces of the teeth free from plaque or removing plaque already formed by treating the oral cavity and especially the surface of the teeth with a compound having the general formula



I

wherein R_1 is a straight or branched alkyl group containing 8 to 10 carbon atoms at the 2- or 3-position of the morpholino ring, and R2 is a straight or branched alkyl group containing 2 to 6 carbon atoms, substituted with a hydroxy group except in the alpha-position, the sum of the carbon atoms in the groups R_1 and R_2 being 12 to 16; and pharmaceutically acceptable salts thereof, in an aqueous solution or in a composition containing the same.

4,894,222

WATERPROOF SUNSCREEN

Peter Matravers, San Marino, Calif., assignor to Neutrogena Corporation, Los Angeles, Calif.

Filed Apr. 4, 1988, Ser. No. 177,090

Int. Cl.[4] A61K 7/027, 7/40, 7/42, 7/48

U.S. Cl. 424—59 14 Claims

1. A composition of matter for waterproofing mammalian skin containing in weight percent from about 1 to about 10 percent C_{18}–C_{36} saturated synthetic fatty acid wax, from 3 to about 30 percent anhydrous hydrophobic starch dispersed in about 60 to about 96 percent of pharmacologically acceptable water-free carrier.

4,894,223

USE OF THIOREDOXIN, THIOREDOXIN-DERIVED, OR THIOREDOXIN-LIKE DITHIOL PEPTIDES IN HAIR CARE PREPARATIONS

Vincent P. Pigiet, Neshanic Station, N.J., assignor to Repligen Corporation, Cambridge, Mass.

Continuation-in-part of Ser. No. 770,498, Aug. 28, 1985, which is a continuation-in-part of Ser. No. 674,893, Nov. 26, 1984, abandoned. This application Jan. 4, 1988, Ser. No. 140,353

The portion of the term of this patent subsequent to Apr. 19, 2005, has been disclaimed.

Int. Cl.[4] A61K 7/06, 7/09

U.S. Cl. 424—71 1 Claim

1. A process for softening human or animal hair which comprises applying to said human or animal hair a composition comprising a sulfite or bisulfite compound at a concentration of about 0.01 M to about 0.2 M, and a thioredoxin, or thioredoxin-derived, or thioredoxin-like dithiol peptide at a concentration of about 1 nmole/ml to about 100 nmole/ml.

4,894,224

ORGANOPOLYSILOXANE COMPOSITION

Satoshi Kuwata, Annaka, and Ikuo Fukui, Joetsu, both of Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Apr. 20, 1988, Ser. No. 183,879

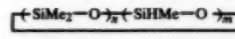
Claims priority, application Japan, Apr. 20, 1987, 62-96700

Int. Cl.[4] A61K 7/00, 7/06, 7/48

U.S. Cl. 424—78 9 Claims

1. An organopolysiloxane composition which comprises, in admixture:

(A) from 90 to 30% by weight of a cyclic organopolysiloxane represented by the general formula



in which Me is a methyl group and m and n are each zero or a positive integer not exceeding 8 with the proviso that m+n is a positive integer of 3 to 8;

(B) from 5 to 50% by weight of an oleaginous material selected from the group consisting of esters of a saturated fatty acid having 8 to 20 carbon atoms in a molecule and a saturated aliphatic alcohol having 1 to 20 carbon atoms in a molecule, animal oils, vegetable oils, squalane and petrolatum; and

(C) from 2 to 30% by weight of a cellulose ether having ester-forming substituent groups derived from a saturated fatty acid having 10 to 20 carbon atoms in a molecule,

the total amount of the components (A), (B) and (C) being taken as 100% by weight.

4,894,225

COMBINATION THERAPY USING ANTITUMOR IMMUNOTOXINS WITH TUMOR NECROSIS FACTOR

Robert Zimmerman, Lafayette, Calif., assignor to Cetus Corporation, Emeryville, Calif.

Filed Mar. 2, 1987, Ser. No. 20,443

Int. Cl.[4] A61K 37/02, 39/00, 39/395

U.S. Cl. 424—85.1 9 Claims

1. A composition which comprises a pharmacologically effective mixture of TNF and a suitable immunotoxin.

4,894,226
SOLUBILIZATION OF PROTEINS FOR PHARMACEUTICAL COMPOSITIONS USING POLYPROLINE CONJUGATION
Lois Aldwin, San Mateo, and Danute E. Nitecki, Berkeley, both of Calif., assignors to Cetus Corporation, Emeryville, Calif.
Filed Nov. 14, 1986, Ser. No. 931,197
Int. Cl.[4] A61K *37/02, 45/02*
U.S. Cl. 424—85.2 16 Claims

1. A pharmaceutical composition comprising a non-toxic, inert, pharmaceutically acceptable aqueous carrier medium in which is dissolved a biologically active protein, selected from the group consisting essentially of interferons, interleukins, colony stimulating factors, and immunotoxins, covalently conjugated via a flexible spacer arm to polyproline, wherein said protein in its unconjugated form is not readily soluble in said aqueous carrier medium at pH 6–8 in the absence of a solubilizing agent.

4,894,227
COMPOSITION OF IMMUNOTOXINS WITH INTERLEUKIN-2
Paul Stevens; L. L. Houston, both of Oakland; Kirsten E. Koths, El Cerrito, and Brian Iseli, Moraga, all of Calif., assignors to Cetus Corporation, Emeryville, Calif.
Continuation-in-part of Ser. No. 892,596, Aug. 1, 1986. This application May 29, 1987, Ser. No. 55,681
The portion of the term of this patent subsequent to Sep. 5, 2006, has been disclaimed.
Int. Cl.[4] A61K *37/02*
U.S. Cl. 424—85.2 10 Claims

1. A composition comprising a mixture, in pharmacologically effective amounts, of IL-2 from a mammalian species and at least one immunotoxin that binds selectively to cells containing the tumor burden.

4,894,228
VACCINE AGAINST HEPATITIS A VIRUS
Robert H. Purcell, Boyds; John R. Ticehurst, Kensington, both of Md.; Jeffrey I. Cohen, Newton, Mass.; Suzanne U. Emerson, Silver Springs, Md.; Stephan M. Feinstone; Richard J. Daemer, both of Washington, D.C., and Ian D. Gust, Melbourne, Australia, assignors to The United States of America as represented by the Department of Health and Human Services, Washington, D.C.
Continuation-in-part of Ser. No. 905,146, Sep. 9, 1986, abandoned, which is a continuation-in-part of Ser. No. 652,067, Sep. 19, 1984, Pat. No. 4,620,978. This application Jul. 12, 1988, Ser. No. 217,824
Int. Cl.[4] A61K *39/29*
U.S. Cl. 424—89 6 Claims

1. An attenuated hepatitis A virus comprising a genome characterized by the following nucleotides: cytosine at positions 3919, 4043, 4222 and 4810; guanine at positions 964 and 3196; adenine at positions 1742, 2864, 4185, 4563, 5204, 6147 and 6522; and thymine at positions 3025, 3889, 4087 and 5232.

4,894,229
CARRIER-BOUND IMMUNOGENIC DETERMINANTS AND CARRIER THEREFOR
Alfred Polson, Camps Bay, and Kirsten J. Van der Merwe, Stellenbosch, both of South Africa, assignors to South African Inventions Development Corporation, South Africa
Continuation-in-part of Ser. No. 399,093, Jul. 16, 1982, abandoned. This application Apr. 21, 1986, Ser. No. 854,242
Claims priority, application South Africa, Jul. 17, 1981, 81/4898
Int. Cl.[4] C12N *17/20*; A61K *39/00, 37/00*
U.S. Cl. 424—92 43 Claims

1. A carrier substance for immunogenic determinants, comprising immunogenicity-increasing carrier particles derived from gram-negative bacterial cells substantially devoid or depleted of natural immunogenic determinants of the cells and comprising that region of the cells which includes lipid A and from there ranges inwardly towards the cell interior and including cell wall material, the particles having been chemically treated with a linking reagent in an amount to provide covalently bonded intermediate linking moieties exposed on the particles, providing reactive functional groups adapted to be bonded covalently to an immunogenically effective amount of selected haptens or immunogens comprising immunogenic determinants, while preserving the adjuvant character of the lipid A and cell wall material.

4,894,230
DELAYED HYDROLYSIS OF METAL PHOSPHIDES
Wolfgang Friemel, Heppenheim; Volker Barth, Ludwigshafen, and Hildegund Dierks, Erbach, all of Fed. Rep. of Germany, assignors to Detia Freyberg GmbH, Laudenbach, Fed. Rep. of Germany
Filed Dec. 29, 1987, Ser. No. 138,772
Claims priority, application Fed. Rep. of Germany, Jan. 5, 1987, 3700176
Int. Cl.[4] A01G *25/08*
U.S. Cl. 424—409 25 Claims

1. A phosphine gas generating pest control agent comprising a a hydrolyzable alkaline earth or earth metal phosphide composition in the form of molded or shaped even surfaced bodies, each of which even surfaced bodies are coated with an uninterrupted coating of a moisture permeable solid organic material of predetermined moisture permeability which initially prevents and later restricts the access of water to the phosphide, which coating completely envelops the even surfaced bodies, retards the phosphine gas generation for a predetermined initial delay period after the pest control agent is exposed to ambient moisture of one or more hours, during which delay period phosphine gas generation is substantially prevented and after which delay period bursting of the coating occurs and generation of phosphine gas begins substantially uninhibited by the coating, the duration of the delay period and the timing of the commencement of uninhibited generation of phosphine gas being predetermined by the moisture permeability of the coating.

4,894,231
THERAPEUTIC AGENT DELIVERY SYSTEM
Jacques-Pierre Moreau, Upton, and Judith P. Kitchell, Newton, both of Mass., assignors to Biomeasure, Inc., Hopkinton, Mass.
Filed Jul. 28, 1987, Ser. No. 78,534
Int. Cl.[4] A61F *2/00*; A61K *9/14*
U.S. Cl. 424—426 9 Claims

1. A therapeutic agent delivery system comprising a biodegradable polymer and a therapeutic agent, said delivery system being coated with a barrier substance that decreases the quantity of said agent released from said system, compared with the quantity of said agent released from a said system not coated with said barrier substance, in the forty-eight hours subsequent to the parenteral injection or implantation of said system into a living person or animal, said barrier substance being selected from the group consisting of a paraffin, beeswax, or a silicone oil and being adapted to dissipate from said delivery system within a short time period after said injection or implantation.

4,894,232

BASE FOR MUCOSAL AND DENTURE ADHESIVE PASTES, A PROCESS FOR THE PREPARATION THEREOF, AND PASTES HAVING THIS BASE

Bernhard Reiß, Königstein/Taunus, and Walter Petri, Niedernhausen/Taunus, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Apr. 26, 1988, Ser. No. 186,387

Claims priority, application Fed. Rep. of Germany, Apr. 28, 1987, 3714074

Int. Cl.[4] A61K 9/06, 6/00

U.S. Cl. 424—439 12 Claims

1. A base for mucosal and denture adhesive pastes comprising, a solid swelling agent which is swellable only in water and is dispersed in a colloidal solution of an organic second swelling agent in a water-soluble, physiologically tolerated organic solvent, wherein the organic second swelling agent is swellable in water and is an ionic swelling agent xanthum gum.

4,894,233

NOVEL DRUG DELIVERY SYSTEM FOR DECONGESTANTS

Shri C. Sharma, 40 Oak Knoll Rd., Mendham, N.J. 07945; James J. Shaw, S-9 Farmhouse La., Morristown, N.J. 07960, and Robert K. Yang, 90 Sun Valley Way, Morris Plains, N.J. 07950

Division of Ser. No. 701,470, Feb. 14, 1985, Pat. No. 4,797,288, Continuation-in-part of Ser. No. 658,099, Oct. 5, 1984, Pat. No. 4,597,970. This application Jul. 26, 1988, Ser. No. 224,594

Int. Cl.[4] A61K 9/20, 9/28

U.S. Cl. 424—440 19 Claims

1. A dry particulate drug delivery system designed to be chewed or swallowed whole comprising:

(A) a decongestant in an amount of about 1%, to about 75%; and

(B) a hydrophobic matrix comprising

(i) about 0.5% to about 20% by weight of an emulsifier; and

(ii) about 61% to about 95% by weight of an edible material having a melting point in the range of about 25° C. to about 100° C. selected from the group consisting of (a) fatty acids having an iodine value of about 1 to about 10, (b) natural waxes, (c) synthetic waxes and (d) mixtures thereof; and

(iii) at least one glyceride, wherein the decongestant and hydrophobic matrix form an agglomerate, and

(C) a coat effective to delay hydration until ingested comprising about 200% to about 400% by weight of the agglomerate an edible material having a melting point in the range of about 25° C. to about 100° C. selected from the group consisting of (a) fatty acids having an iodine value of about 1 to about 10, (b) natural waxes, (c) synthetic waxes and (d) mixtures thereof; wherein the coat forms a protective barrier effective to prevent unpleasant taste perception for the decongestant agglomerate.

4,894,234

NOVEL DRUG DELIVERY SYSTEM FOR ANTIARRHYTHMICS

Shri C. Sharma, 40 Oak Knoll Rd., Mendham, N.J. 07945; James J. Shaw, S-9 Farmhouse La., Morristown, N.J. 07960, and Robert K. Yang, 90 Sun Valley Way, Morris Plains, N.J. 07950

Division of Ser. No. 701,470, Feb. 14, 1985, Pat. No. 4,797,288, which is a continuation-in-part of Ser. No. 658,099, Oct. 5, 1984, Pat. No. 4,752,485. This application Jul. 26, 1988, Ser. No. 224,602

Int. Cl.[4] A61K 9/20, 9/28, 9/42

U.S. Cl. 424—440 17 Claims

1. A dry particulate drug delivery system designed to be chewed or swallowed whole comprising:

(A) an antiarrhythmic in an amount of about 1%, to about 75%; and

(B) a hydrophobic matrix comprising

(i) about 0.5% to about 20% by weight of an emulsifier; and

(ii) about 61% to about 95% by weight of an edible material having a melting point in the range of about 25° C. to about 100° C. selected from the group consisting of fatty acids having an iodine value of about 1 to about 10, (b) natural waxes, (c) synthetic waxes and (d) mixtures thereof; and

(iii) at least one glyceride, wherein the antiarrhythmic and hydrophobic matrix form an agglomerate, and

(C) a coat effective to delay hydration until ingested comprising about 200% to about 400% by weight of the agglomerate an edible material having a melting point in the range of about 25° C. to about 100° C. selected from the group consisting of (a) fatty acids having an iodine value of about 1 to about 10, (b) natural waxes, (c) synthetic waxes and (d) mixtures thereof; wherein the coat forms a protective barrier effective to prevent unpleasant taste perception for the antiarrhythmic agglomerate.

4,894,235

NIFEDIPINE-CONTAINING FORM OF ADMINISTRATION AND METHOD FOR ITS PRODUCTION

Hans Köhne, Obersulmetingen; Wolfgang Lahr, Laupheim, and Hein U. Schmersahl, Ehingen-Gamerschwang, all of Fed. Rep. of Germany, assignors to Dr. Rentschler, Arzneimittel GmbH & Co., Laupheim, Fed. Rep. of Germany

Filed Oct. 3, 1985, Ser. No. 783,862

Claims priority, application Fed. Rep. of Germany, Oct. 23, 1984, 3438830

Int. Cl.[4] A61K 9/48, 9/66

U.S. Cl. 424—452 22 Claims

1. In an administratable composition in the form of a hard gelatin capsule containing an effective amount of Nifedipine molecularly dispersed within a solidified melt comprised of a mixture of liquid and non-liquid polyethylene glycols selected from the group consisting of polyethylene glycols which are liquid, semi-solid solid and solid at room temperature, the improvement wherein said liquid and non-liquid polyethylene glycols are present in said solidified melt in a weight ratio of liquid to non-liquid polyethylene glycols ranging from about 7:23 to 23:7, the solidification temperature of the mixture ranging from about 25° C. to 62° C. and the mixture having a viscosity ranging from about 1 to 180,000 poise when measured at 20° C. in admixture with up to about 40 percent by weight of water, whereby leakage of the polyethylene glycol melt upon solidification of same from said capsule is avoided and the molecularly dispersed Nifedipine will not recrystallize with said melt while avoiding decreased bioavailability of the Nifedipine due to the reduced solubility exhibited by the recrystallized Nifedipine.

4,894,236

DIRECT COMPRESSION TABLET BINDERS FOR ACETAMINOPHEN

Choong-Gook Jang, 2 Michelle La., Warren, N.J. 07060, and Yoon Im, North Brunswick, N.J., assignors to Choong-Gook Jang, New Brunswick, N.J.

Filed Jan. 12, 1988, Ser. No. 142,909

Int. Cl.[4] A61K 9/26

U.S. Cl. 424—470 6 Claims

1. A dry, direct, compressed product consisting essentially of from 60 to 90 weight percent of acetoaminophen and from 10 to 40 weight percent of hydrogenated cottonseed oil whereby said product has a hardness of at least 5 kilograms.

4,894,237

ANTIINFLAMMATORY PHARMACEUTICAL COMPOSITION ENDOWED WITH SUSTAINED EFFECT FOR TOPICAL USE

Pietro Bellani, and Luigi Valcarenghi, both of Milan, Italy, assignors to Cooperativa Farmaceutica Soc. Coop. R.L., Milan, Italy

Filed Aug. 22, 1988, Ser. No. 234,182
Claims priority, application Italy, Sep. 4, 1987, 21981A/87
Int. Cl.[4] A61K 9/14
U.S. Cl. 424—486 9 Claims

1. Sustained effect pharmaceutical composition, suited for the topical administration, comprising as the active principle the piperazine salt of (S) 6-methoxy-α-methyl-2-naphthaleneacetic acid in micronized form in admixture with primary carriers selected in the group consisting of polyethylene glycol, propylen glycol, glycerine, purified water and isopropyl alcohol or mixtures thereof and with an hydrophylic, pH-independent, matrix consisting of cellulose alkyl derivative of cellulose and/or polyvinyl alcohol.

4,894,238

CONTROLLED RELEASE COMPOSITIONS

Mostyn P. Embry, Woodstock, Great Britain, and Neil B. Graham, Bearsden, Scotland, assignors to National Research Development Corporation, London, England

Continuation of Ser. No. 6,328, Jan. 14, 1987, abandoned, which is a continuation of Ser. No. 854,072, Apr. 17, 1986, abandoned, which is a continuation of Ser. No. 630,357, Jul. 16, 1984, abandoned, which is a continuation of Ser. No. 387,774, Jun. 14, 1982, abandoned, which is a continuation of Ser. No. 212,735, Nov. 5, 1980, abandoned. This application Jun. 14, 1988, Ser. No. 208,849
Claims priority, application United Kingdom, Mar. 21, 1979, 7909853
Int. Cl.[4] A61K 47/00, 9/00, 9/02
U.S. Cl. 424—486 18 Claims

1. A controlled release composition comprising an active substance other than a prostaglandin, and a polymeric carrier therefore comprising residues which are cross-linked through urethane groups, or analogues thereof, and which comprise polyethylene oxide having a ratio of number average molecular weight to functionality greater than 1,500, the degree of cross-linking being such that there is at least one cross-linking point per ten residues comprising the said polyethylene oxide but such that the proportion of the said polyethylene oxide is greater than 50% by weight of the polymeric carrier which is a crystalline hydrogel in the dry form and exhibits syneresis in the wet form.

4,894,239

SUSTAINED-RELEASE PREPARATION AND PRODUCTION THEREOF

Maneo Nonomura; Yasuyuki Suzuki, both of Osaka, and Masayuki Yamada, Hyogo, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed May 16, 1988, Ser. No. 194,210
Claims priority, application Japan, Jun. 2, 1987, 62-138781
Int. Cl.[4] A61K 9/16
U.S. Cl. 424—497 13 Claims

1. A sustained-release microcapsule preparation comprising:
(a) an ion exchange resin which is about 6 to 16% cross-linked,
(b) a drug adsorbed onto the ion exchange resin in an amount not less than 80% of its theoretical ion adsorption amount, and
(c) a water-permeable polymer coating.

4,894,240

CONTROLLED ABSORPTION DILTIAZEM FORMULATION FOR ONCE-DAILY ADMINISTRATION

Edward J. Geoghegan; Seamus Mulligan, both of Athlone, Ireland, and Donald E. Panoz, Tuckerstown, Bermuda, assignors to Elan Corporation plc, Athlone, Ireland

Continuation-in-part of Ser. No. 684,661, Dec. 20, 1984, Pat. No. 4,721,619. This application Nov. 16, 1987, Ser. No. 121,225
Int. Cl.[4] A61K 9/16
U.S. Cl. 424—497 28 Claims

1. A diltiazem pellet formulation for oral administration, said pellet comprising a core to diltiazem or a pharmaceutically acceptable salt thereof in association with an organic acid, the diltiazem component and the organic acid being present in a ratio of from 20:1 to 1:1, and a multi-layer membrane surrounding said core and containing a major proportion of a pharmaceutically acceptable film-forming, water insoluble synthetic polymer and a minor proportion of a pharmaceutically acceptable film-forming, water soluble synthetic polymer, the number of layers in said membrane and the ratio of said water soluble to water insoluble polymer being effective to permit release of said diltiazem from said pellet at a rate allowing controlled absorption thereof over a twenty four hour period following oral administration, said rate being measured in vitro as a dissolution rate of said pellet, which when measured in a type 2 dissolution apparatus (paddle) according to U.S. Pharmacopoeia XXI in 0.05M KCl at pH 7.0 and at 100 r.p.m. substantially corresponds to the following dissolution pattern:
(a) from 0 to 35% of the total diltiazem is released after 2 hours of measurement in said apparatus;
(b) from 5 to 45% of the total diltiazem is released after 4 hours of measurement in said apparatus;
(c) from 30 to 75% of the total diltiazem is released after a total of 8 hours of measurement in said apparatus;
(d) from 60 to 95% of the total diltiazem is released after 13 hours of measurement in said apparatus; and
(e) not less than 85% of the total diltiazem is released after 24 hours of measurement in said apparatus.

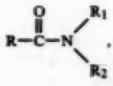
4,894,241

HALOPHOR COMPOSITION

Paritosh M. Chakrabarti, Pittsburgh, Pa.; Roger A. Crawford, Wadsworth, and Robert H. Juda, Akron, both of Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jan. 16, 1986, Ser. No. 819,443
Int. Cl.[4] A61K 33/36, 59/00; C11D 3/48
U.S. Cl. 424—672 18 Claims

1. A substantially water-free halophor comprising a complex of (a) halogen selected from the group consisting of bromine and iodine, (b) tertiary amide represented by the graphic formula:



wherein R is selected from the group consisting of hydrogen and C_1–C_2 alkyl, R_1 is a C_1–C_4 alkyl, and R_2 is selected from the group consisting of C_1–C_4 alkyl and phenyl, and (c) halide represented by the formula, MX, wherein M is alkali metal selected from the group consisting of sodium, potassium and lithium, or alkaline earth metal selected from the group consisting of calcium and magnesium, and X is bromine, chlorine or iodine, the mole ratio of halide to halogen being from about 1:1 to 1:12, and the amount of halogen in the complex being between about 10 and about 50 weight percent.

4,894,242

NUTRITIONAL RICE MILK PRODUCT

Cheryl R. Mitchell; Pat R. Mitchell, both of 446 N. Powers, Manteca, Calif. 95336, and Robert Nissenbaum, 750 Homer Ave., Palo Alto, Calif. 94301

Division of Ser. No. 856,300, Apr. 24, 1986, Pat. No. 4,744,992. This application Mar. 29, 1988, Ser. No. 174,832

Int. Cl.[4] A23L *1/10, 2/38*

U.S. Cl. 426—29 26 Claims

1. A nutritional rice milk product produced by a method comprising the steps of

selecting a starting material as a whole grain rice and dividing it into particles of reduced size,

liquifying the whole grain rice particles with a alphaamylase enzyme in an aqueous medium to form a liquid slurry, and

treating the liquid slurry with glucosidase enzyme in a saccharification step for a period of less than about three hours in order to yield a rice milk product retaining nutritional components from the whole grain rice, having a glucose content of about 5 to 70% of solids, a protein content on a dry-weight basis of less than about 3.5%, the rice milk product being distinctly cloudy and colloidal or non-filtratable.

4,894,243

METHOD OF REDUCING THE HEALTH RISKS DURING THE HANDLING OF PACKAGED NON-STERILIZED FOODSTUFFS

Lennart Ahrné , Bjärred, Sweden, assignor to AB Tetra Pak, Lund, Sweden

Filed Jul. 27, 1987, Ser. No. 78,114

Claims priority, application Sweden, Aug. 14, 1986, 8603420

Int. Cl.[4] A23C *9/12*

U.S. Cl. 426—43 7 Claims

1. A method for reducing health risks during handling of packaged, non-sterilized milk comprising the steps of:

adding bacteria including Lactobacilli, Lactococci, or Leuconostocci to the milk at least one of before and directly following the packaging of the milk;

the bacteria not being capable of substantial growth at temperatures below 7°–10° C. capable of provoking growth of harmful microorganisms; and the bacteria being added in an amount effective to compete out and prevent multiplication of undesirable bacteria in the packaged milk upon exposure of the milk to temperatures higher than 7°–10° C. capable of provoking growth of harmful microorganisms.

4,894,244

PROCESS FOR TREATING A HYDROCARBON PLANT MATERIAL AND PRODUCT PRODUCED THEREBY

Nicole Kanter, Metz, France, assignor to S.E.T.A., Meitz, France

Filed Oct. 27, 1987, Ser. No. 114,076

Int. Cl.[4] A23J *1/14;* A23L *1/20, 1/214, 1/212*

U.S. Cl. 426—46 12 Claims

1. A process for treating a hydrocarbon plant substrate containing glucids and proteins to obtain a food product having a higher protein content than the starting plant material and a particular flavor which is dependent upon the thermolysis conditions employed, comprising the combinative steps of:

first hydrolyzing said substrate with a hydrosolubilizing enzyme to form hydrosolubilized glucids;

fermenting the resulting product including said hydrosolubilized glucids with a yeast at a pH from 3 to 5 and subjecting the thus fermented product to thermolysis at a temperature ranging from 80° C. to 140° C. for a corresponding period of time of 30 seconds to one hour; wherein during said thermolysis step differing flavors are obtained depending upon the selected temperature and time combinations employed.

4,894,245

COATED FROZEN CHEESE GRANULES

Lester O. Kielsmeier, Lakewood; Richard L. Barz, Longmont, and Wesley J. Allen, Littleton, all of Colo., assignors to Leprino Foods Company, Denver, Colo.

Continuation of Ser. No. 142,910, Jan. 12, 1988, abandoned, which is a continuation-in-part of Ser. No. 36,022, Apr. 8, 1987, Pat. No. 4,753,815. This application Dec. 15, 1988, Ser. No. 285,305

The portion of the term of this patent subsequent to Jun. 28, 2005, has been disclaimed.

Int. Cl.[4] A23C *19/00;* A23L *1/03*

U.S. Cl. 426—68 11 Claims

1. A frozen cheese product for use as a topping on baked foods, comprising quick-frozen cheese granules having a thin aqueous coating frozen on the exterior surface of the individual granules, said coating being distributed over the outer surface of the individual granules, the coated granules being in free-flowing condition, the amount of said coating comprising about 0.5 to 4 parts by weight per each 100 parts of uncoated granules, and the coating consisting of at least one layer containing at least one cheese additive.

4,894,246

PROCESSES AND DOUGH COMPOSITIONS FOR PRODUCING COOKIES CONTAINING LOW-MELTING FAT

Clemence K. Dartey, Oakland; John W. Finley, Whippany, and Robert R. Thulin, Wyckoff, all of N.J., assignors to Nabisco Brands, Inc., East Hanover, N.J.

Continuation of Ser. No. 786,097, Oct. 10, 1985, Pat. No. 4,722,849. This application Aug. 7, 1987, Ser. No. 82,540

The portion of the term of this patent subsequent to Feb. 2, 2005, has been disclaimed.

Int. Cl.[4] A21D *8/00, 13/00*

U.S. Cl. 426—94 26 Claims

1. A cookie dough composition for preparing a cookie less susceptible to halo and bloom effects, said composition comprising flour, a sugar, chocolate chips, fat or shortening having a solid fat index in the range of about 15 to about 25 percent at 70° F., said fat or shortening being solid up to at least about 80° F., and a low-melting fat, the low-melting fat having a solid fat index of from about 18 to 31 at 50° F., a solid fat index of from about 7 to about 11 at 80° F. and being essentially completely liquid at about 100° F., the low-melting fat comprising from about 5 to about 30 percent by weight of the total weight of fat and shortening in the cookie dough composition.

11. A process for preparing a multi-textured cookie, which process comprises:

mixing flour, a humectant and fat or shortening to form a first cookie dough;

mixing flour, a sugar, fat or shortening having a solid fat index in the range of about 15 to about 25 percent at 70° F., said fat or shortening being solid up to at least about 80° F., and a low-melting fat to form a second cookie dough, the low-melting fat having a solid fat index of from about 18 to 31 at 50° F., a solid fat index of from about 7 to about 11 at 80° F. and being essentially completely liquid at 100° F., the low-melting fat comprising from about 5 to about 30 percent by weight of the total weight of fat and shortening in the second cookie dough;

enrobing a portion of the first cookie dough within a portion of the second cookie dough to produce a composite dough piece; and

baking the composite dough piece to form a multi-textured cookie with a soft-textured center and a firm outer layer.

4,894,247

FIBROUS MICROWAVE SUSCEPTOR PACKAGE

Dan S. C. Fong, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 11, 1987, Ser. No. 131,663
Int. Cl.[4] A23L *3/10*; H05B *6/64*
U.S. Cl. 426—107 20 Claims

1. A package useful for heating or cooking a food item in a microwave oven, comprising

(a) a drapable, liquid permeable, microwave susceptive composite material comprising a fibrous dielectric substrate treated with at least one microwave susceptor material, said composite material being folded over said food item and in contact with the exterior surfaces of said food item, said composite material forming extensions beyond the periphery of said food item, the inner surfaces of the extensions being in contacting relationship with each other, the extensions forming a flap around at least a part of the periphery of said food item, and

(b) a holder comprising two substantially flat parts, each part being provided with a cutout portion of a size and shape suitable for encompassing said food item contained within said composite material,

wherein the parts of said holder are joined together face to face, the cutout portions being opposite each other and encompassing said food item and composite material, and wherein the flap formed from said composite material extends beyond said cutout portion and is sandwiched between the two flat parts of said holder, thereby securing said food item in the cutout portion.

4,894,248

WINDOWED BACON PACKAGE

John J. Pappas, Kansas City; James G. Keeley, Parkville, and Keith D. Bender, Kansas City, all of Mo., assignors to Container Corporation of America, Clayton, Mo.

Continuation of Ser. No. 79,595, Jul. 30, 1987, abandoned. This application Mar. 8, 1989, Ser. No. 320,908
Int. Cl.[4] B65D *57/00, 75/00, 77/24*
U.S. Cl. 426—121 3 Claims

1. A sliced bacon package comprising a relatively thin, flat opaque, backing member and a plurality of bacon slices arranged lengthwise in partially overlapped relation on said backing member and overwrapped with a transparent film, said backing member, comprising:

(a) a main support panel presenting an outer surface and an inner surface supporting said bacon slices, and having, immediately adjacent one side edge thereof, at least one window opening extending therethrough to accommodate the viewing of at least a portion of a bottom surface of a lowermost bacon slice;

(b) an additional product identification panel integral with and foldably joined, at one side edge thereof, to another side edge of said main support panel and adapted to be folded back toward said main support panel to overlie at least a portion of an upper surface of an uppermost bacon slice;

(c) said backing member being formed of:

(i) a sheet of wax saturated paperboard, coated on each of said surfaces with a layer of a low density, extruded polyethylene film;

(ii) a third layer of transparent film laminated to the entire inner surface of said coated wax saturated paperboard sheet and completely covering said window opening;

(iii) said third film layer being formed from a material selected from the group consisting of polyester and polypropylene.

4,894,249

CURING PROCESS FOR MEATS

Herbert F. Angermeier, Essex Falls, N.J., assignor to Liberty Provisions, Inc., Clifton, N.J.

Filed Mar. 13, 1989, Ser. No. 322,367
Int. Cl.[4] A23B *4/02*
U.S. Cl. 426—264 13 Claims

1. A method for curing fresh primal cuts of meat to provide a substantially sodium-free product including the steps of:

a. forming a curing composition consisting of ammonium chloride, ammonium phosphate, and potassium phosphate, and

b. treating the meat with said curing composition as a function of the weight of the meat being treated to provide the desired meat product.

4,894,250

THERMO-IRREVERSIBLE EDIBLE GELS OF GLUCOMANNAN AND XANTHAN GUMS

Gary D. Munson, and Colin T. Prest, both of Melton Mowbray, United Kingdom, assignors to Mars G.B. Limited, Berkshire, United Kingdom

Filed May 5, 1988, Ser. No. 190,581
Claims priority, application United Kingdom, May 6, 1987, 8710704
Int. Cl.[4] A23L *1/06*
U.S. Cl. 426—573 13 Claims

1. A method for making a thermo-irreversible aqueous gel, which comprises subjecting a gellable combination of xanthan gum and a glucomannan gum at a pH above 6.5 to a heat treatment under conditions of temperature and time to form a gel and to cause the gel to become thermo irreversible.

4,894,251

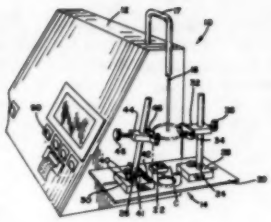
METHOD AND APPARATUS FOR INSPECTING CONTAINERS

Walter J. Sieverin, McHenry, Ill., assignor to American National Can Company, Chicago, Ill.

Filed Jun. 20, 1988, Ser. No. 209,323
Int. Cl.[4] B05C *13/02*
U.S. Cl. 427—8 9 Claims

1. A method of detecting the integrity of a coating on an inner surface of a container having an outwardly-directed flange surrounding an open end thereof with said flange having an uncoated peripheral edge comprising the steps of introducing an electrolytic solution into said container, producing a ground connection with said peripheral edge of said container,

introducing a probe into the solution in said container, producing a voltage of increasing intensity to said probe, and taking a



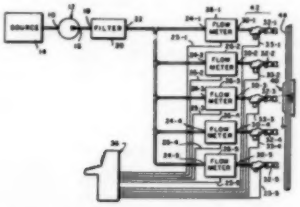
reading of said voltage when the current flow reaches a predetermined intensity.

4,894,252

COATING MATERIAL ORIFICE CLOGGING INDICATION METHOD AND APPARATUS

Francis W. Bongen, Indianapolis; Richard D. Combs, Westfield; James C. Foster, Danville, and Donald G. Godfrey, Indianapolis, all of Ind., assignors to Ransburg Corporation, Indianapolis, Ind.

Filed Nov. 30, 1988, Ser. No. 277,971
Int. Cl.[4] B05D *1/02*; B05C *11/10*
U.S. Cl. 427—8 **4 Claims**



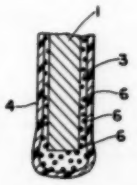
1. A method of coating articles with a coating material on a coating material application line having one or more coating material application stations, the method comprising the steps of providing at each coating station a plurality of coating material dispensing devices, only one of which is operative at any time from which devices coating material can be dispensed onto the articles, providing a source of coating material, coupling each of the devices to the source of coating material through a respective flow rate sensor for each dispensing device, triggering a first selected one of the dispensing devices to dispense coating materials onto an article, sensing the flow of coating material from the selected one of the dispensing devices with the flow rate sensor which couples the source to the first selected one of the dispensing devices, and triggering the first selected one of the dispensing devices to terminate dispensing of coating material and another selected one of the dispensing devices to dispense coating material when the flow rate sensor which couples the source to the first selected one of the dispensing devices senses a flow rate of coating material below a predetermined threshold to the first selected one of the dispensing devices.

4,894,253

METHOD FOR PRODUCTION OF COATED ELECTRODE

William R. Heineman; James E. Mark, both of Cincinnati, Ohio; Emory S. Decastro, Emeryville, Calif., and Christos Galiatsatos, Cincinnati, Ohio, assignors to University of Cincinnati, Cincinnati, Ohio

Division of Ser. No. 895,782, Aug. 12, 1986. This application Aug. 8, 1988, Ser. No. 229,720
Int. Cl.[4] B05D *3/06*
U.S. Cl. 427—36 **19 Claims**



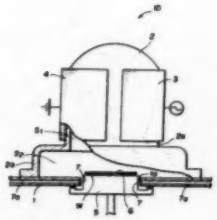
1. A method of producing an electrode which comprises applying to an electroconductive core a liquid inner layer and a liquid outer layer by dipping, spraying or spin coating at a temperature not higher than about 100° C., said inner and outer layers being different materials, at least said outer layer being polymerizable, cross-linking said outer polymerizable layer in situ into a network, and controlling the pore size of said layer to obtain a permeable polymer network.

4,894,254

METHOD OF FORMING SILICONE FILM

Muneo Nakayama, Tokyo; Akira Hashimoto, Kanagawa; Toshihiro Nishimura, Kanagawa; Akira Uehara, Kanagawa, and Isamu Hijikata, Kanagawa, all of Japan, assignors to Tokyo Ohka Kogyo Co., Ltd., Kanagawa, Japan

Filed Nov. 16, 1988, Ser. No. 272,083
Claims priority, application Japan, Nov. 17, 1987, 62-290308
Int. Cl.[4] B05D *3/06*
U.S. Cl. 427—38 **22 Claims**



1. A method of forming a silicone film, comprising the steps of:

(a) coating a solution for forming a silicone film on a substrate and drying the coated solution at a temperature below 150° C. to form a silicone film on the substrate;

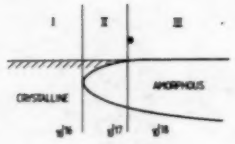
(b) treating the silicone film in a plasma produced from a gas mainly composed of oxygen; and

(c) heating the plasma treated silicone film at a temperature of at least 150° C.

4,894,255
MODIFICATION OF SURFACE PROPERTIES OF CERAMICS

Trevor F. Page, Girton, and Philip J. Bursett, Cambridge, both of England, assignors to United Kingdom Atomic Energy Authority, London, England

Continuation of Ser. No. 596,721, Apr. 4, 1984, abandoned. This application Jul. 28, 1986, Ser. No. 890,889
Claims priority, application United Kingdom, Apr. 15, 1983, 8310298
Int. Cl.[4] C23C 14/48
U.S. Cl. 427—38 6 Claims



1. A method of treating of the surface of a body of a crystalline metal oxide ceramic material to render the said surface less susceptible to brittle fracture, comprising the operation of subjecting the said surface to bombardment with ions having an energy sufficient to disrupt the crystal lattice of the body, and continuing the ion bombardment until an amorphous layer formed in the body as a result of the ion bombardment extends to the surface of the body, wherein the ions are selected from the group consisting of Ti^+, Cr^+, Y^+, and Zr^+.

4,894,256
PROCESS FOR GLOW-DISCHARGE-ACTIVATED REACTIVE DEPOSITION OF METAL FROM A GAS PHASE

Georg F. Gärtner, Aachen, and Peter A. Janiel, Würselen, both of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 28, 1988, Ser. No. 264,488
Claims priority, application Fed. Rep. of Germany, Nov. 17, 1987, 3738993
Int. Cl.[4] B05D 3/06
U.S. Cl. 427—39 6 Claims

1. A process for the reactive deposition of tubular metal bodies on a tubular substrate from a flowing gas phase containing a metal halide by a glow discharge generated in said gas phase and extending between an inner electrode and an outer electrode, one of which electrodes is tubular and serves as said substrate, characterized in that the absolute mass flow of the metal halide is adjusted to at least 60 sccm and the reactive deposition from the gas phase is carried out in the high plasma resistance range.

4,894,257
METHOD OF OVERCOATING A HIGH CURRENT DENSITY CATHODE WITH RHODIUM

Bernard Smith, Ocean Township, Monmouth County; Gerard L. Freeman, Freehold Township, Monmouth County, and Louis E. Branovich, Howell Township Monmouth County, all of N.J., assignors to The United States of America as represented by the Secretary of America, Washington, D.C.

Filed Jul. 5, 1988, Ser. No. 215,081
Int. Cl.[4] B05D 5/12; H01J 1/15, 9/04
U.S. Cl. 427—78 8 Claims

1. A method of making a high current density cathode overcoated with rhodium from a tungsten-iridium billet using chemical vapor deposition techniques, said method including the steps of:

(A) impregnating the billet with a chemical mixture of barium oxide, strontium oxide, and aluminum oxide, by firing the billet in a dry hydrogen furnace at a temperature at which the impregnant melts for about two minutes,

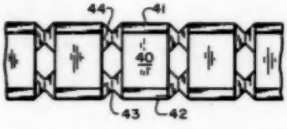
(B) placing the impregnated billet in a vacuum system with feedpipe for the introduction of a precursor of rhodium slightly above the impregnated billet, the impregnated billet also being so positioned that the only surface of the impregnated billet to be exposed to the desired precursor of rhodium is the face of the impregnated billet that is desired for emission, and

(C) heating the impregnated billet to about 450° C. and then introducing preheated hexadecacarbonylhexarhodium (O), slightly above the impregnated billet causing rhodium to deposit on the hot impregnated billet.

4,894,258
CHIP RESISTOR

Thomas D. Belanger, Jr., Clarendon Hills, Ill., assignor to AG Communication Systems Corporation, Phoenix, Ariz.

Continuation-in-part of Ser. No. 171,321, Mar. 21, 1988, abandoned. This application Jan. 9, 1989, Ser. No. 294,443
Int. Cl.[4] B05D 5/12
U.S. Cl. 427—103 9 Claims



1. A method for fabricating thick film resistor assemblies comprising the steps of:

applying a ceramic adhesive dielectric material to one side of a metallic carrier substrate so as to form a plurality of resistive units on said substrate, including fracture areas between any two adjacent resistive areas;

heating said ceramic adhesive-coated carrier substrate to cure said ceramic adhesive, whereby said adhesive becomes solid;

applying a coating of resistive material to said solidified ceramic adhesive dielectric material;

heating the resultant assembly to eliminate any organic component from said resistive material;

applying conductive material to form one or more conductors to said resistive material;

heating the resultant assembly to eliminate any organic component in said conductive material;

firing the total assembly to a temperature of at least 704 degrees centigrade for a period within the range of from

40 to 80 minutes with the temperature reaching its maximum range for a period within the range of 8 to 12 minutes centered about the midpoint of said firing period, to eliminate the adhesive characteristic of said ceramic material;

separating said carrier substrate from said assembly; and

separating said resistive units by manually applying pressure at each of said fracture areas, whereby said resistive units are separated from each other.

4,894,259

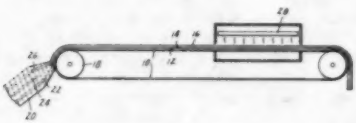
PROCESS OF MAKING A UNIFIED PRESSURE-SENSITIVE ADHESIVE TAPE

Douglas H. Kuller, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 90,671, Aug. 27, 1987, which is a continuation-in-part of Ser. No. 84,781, Aug. 17, 1987, which is a continuation-in-part of Ser. No. 900,372, Aug. 29, 1986, abandoned. This application Jun. 28, 1988, Ser. No. 212,596

Int. Cl.[4] B05D *5/10*

U.S. Cl. 427—208.8 **3 Claims**



1. A process for making a pressure-sensitive adhesive tape comprising a plurality of concurrently coated simultaneously photopolymerized superimposed layers, said layers having been simultaneously photopolymerized, at least one outer layer being a pressure-sensitive adhesive layer, said pressure-sensitive adhesive layer comprising at least one alkyl acrylate ester of a nontertiary alcohol, and a photoinitiator, contiguous layers defining an interface therebetween, each of said layers comprising a photopolymerized matrix of polymeric chains; said polymeric chains extending from the matrix of one of said layers through said interface into the matrix of a contiguous layer; said polymeric chains comprising polymerized monomers having migrated from the matrix of each contiguous layers, said process comprising the steps of:

(1) preparing a plurality of coatable compositions, each of said coatable compositions comprising at least one photopolymerizable monomer; at least one of said coatable compositions being curable to a pressure-sensitive adhesive state, monomers of each of said coatable compositions being copolymerizable when blended and subjected to photopolymerization conditions;

(2) concurrently coating said coatable compositions to provide a plurality of superimposed layers with contiguous layers defining an interface therebetween, with one composition which is curable to a pressure-sensitive adhesive state being coated as an outer layer;

(3) permitting migration of photopolymerizable monomers through said interface between contiguous layers; and

(4) subjecting said superimposed layers to irradiation to simultaneously photopolymerize said monomers in each layer, and to provide polymeric chains comprised of copolymers of photopolymerizable monomers originating from contiguous layers extending through said interface therebetween;

thereby to produce a tape having layers which cannot be delaminated.

4,894,260

ELECTROLESS PLATING METHOD AND APPARATUS

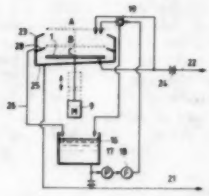
Osamu Kumasaka, and Nobuki Yamaoka, both of Yamanashi, Japan, assignors to Pioneer Electronic Corporation, Tokyo and Pioneer Video Corporation, Yamanashi, both of, Japan

Filed Sep. 19, 1988, Ser. No. 246,387

Claims priority, application Japan, Sep. 19, 1987, 62-235371

Int. Cl.[4] B05D *3/12*

U.S. Cl. 427—241 **5 Claims**



1. An electroless plating method for plating a disk, comprising the steps of rotating said disk to be plated with its main surface upturned, causing a plating-pretreating solution to fall onto said main surface from above said main surface so as to bring said plating-pretreating solution into contact with said main surface, causing a cleaning solution to fall from above said main surface onto said main surface to thereby clean said main surface, causing a plating solution to fall from above said main surface onto said main surface to bring said plating solution into contact with said main surface, and causing a cleaning solution to fall from above said main surface onto said main surface to thereby clean said main surface.

4,894,261

PRODUCTION OF A MULTILAYER COATING

Erich Gulbins, Heidelberg, and Gregor Ley, Wattenheim, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jul. 8, 1988, Ser. No. 216,614

Claims priority, application Fed. Rep. of Germany, Jul. 23, 1987, 3724369

Int. Cl.[4] B05D *3/02*

U.S. Cl. 427—379 **5 Claims**

1. A process for the production of a multilayer coating on a substrate which comprises:

applying to a substrate as a basecoat an aqueous dispersion containing effective amounts of

(A) a carbonyl-containing copolymer of mono-olefinically unsaturated compounds, not less than 10% by weight of which have carbonyl groups which react with hydrazide groups, and

(B) polyhydrazides,

flashing off the water from the dispersion, whereupon the carbonyl groups of the copolymer react with the polyhydrazides to form a crosslinked film on the substrate, and thereafter

applying one or more further coats to the base-coat.

5. The process of claim 1, wherein the basecoat and the additional coats are baked for from 10 to 60 minutes at from 70 to 180° C.

4,894,262

LUMBER END SEALING MACHINE

Thomas A. Heitmanek, Portland, Oreg., assignor to API, Inc., Eugene, Oreg.

Filed Oct. 24, 1988, Ser. No. 261,740

Int. Cl.[4] B05D *1/02*

U.S. Cl. 427—393 **8 Claims**

7. A method of end sealing of packages of lumber being

transported by conveyor means, comprising the following steps:

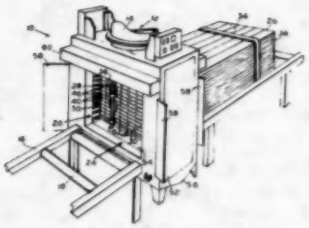
a. Detecting the leading end face of the package of lumber proceeding on the conveyor means;

b. Stopping the package of lumber so that its leading end face halts substantially at the center of an exhaust chamber;

c. Initiating movement of a sealer paint spraying means, including spraying guns, transversely across the end face in the exhaust chamber;

d. Initiating spraying of sealer paint upon the end face in the exhaust chamber as the spray guns of the spraying means pass a first vertical side edge thereof, with the spray guns located to the inside of the first vertical side edge of the end face, and the spray directed outwardly against said first vertical side edge;

e. Continuing transverse movement of the spraying means across the end face and concurrently rotating the spray guns so that the spray passes through a perpendicular orientation to said end face;



f. Terminating the spraying of sealer paint when the spray of the spray guns reaches a second, and opposing, vertical side edge of the end face, the spray guns still being inside the second and opposing vertical side edge of the end face, and the spray being directed outwardly against said second and opposing vertical side edge of the end face of the package of lumber in the exhaust chamber;

g. Continuing transverse movement of the sealer paint spraying means until the spray guns clear to the outside of the second and opposing vertical side edge of the end face in the exhaust chamber;

h. Starting the conveyor for continuation of movement of the package of lumber through the exhaust chamber;

i. Detecting the trailing end face of the package of lumber proceeding on the conveyor;

j. Stopping the package of lumber so that its trailing end face halts at substantially the center of the exhaust system;

k. Repeating steps 'c' through 'g' with a second sealing paint spraying means; and

m. Starting the conveyor so as to move the end-sealed package of lumber out of the exhaust chamber and on down the conveyor.

4,894,263

MESOMORPHIC POLYMER MATERIAL USABLE IN NON LINEAR OPTICS

Jean C. Dubois, Remy les Chevreuses; Gilles Ravaux, Les Ulis, and Pierre Le Barny, Orsay, all of France, assignors to Thomson-CSF, Paris, France

Continuation of Ser. No. 37,729, Apr. 13, 1987. This application Oct. 24, 1988, Ser. No. 265,337

Claims priority, application France, Apr. 15, 1986, 86 05362

Int. Cl.[4] C09K *19/00*; C08F *220/36*

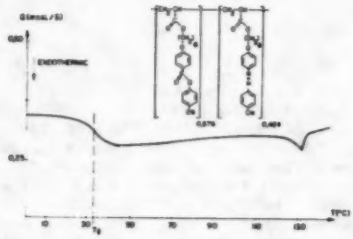
U.S. Cl. 428—1 **10 Claims**

1. In an optoelectronic article, the improvement comprising using a mesomorphic polymeric material whose structure includes a skeleton to which side chains are attached, the material resulting from the association of a first and a second monomer, each of the monomers possessing an element of said skeleton and a side chain characteristic of this monomer, wherein:

the skeleton is a polyacrylate, a polymethacrylate, a polychloroacrylate or a polysiloxane;

the side chains are formed of an element specific to the monomers and a spacer allowing attachment thereof to the skeleton element;

the spacer is of the type $-(CH_2)_n-$ with $2 \leqq n \leqq 15$ or $-(CH_2-CH_2-O)_n-$ with $1 \leqq n \leqq 5$;



the element specific to the first monomer is a mesomorphogenic group having a positive dielectric anisotropy;

the element specific to the second monomer is a group having the following structure: D-(delocalized π electron system)-A, where D is an electron donating group and A an electron accepting group, this specific element being joined to the spacer on the group D side.

4,894,264

GUSSET BAG FOR PHOTOGRAPHIC PHOTOSENSITIVE MATERIALS

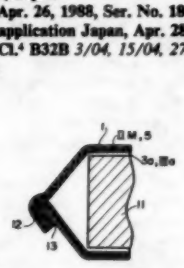
Mutsuo Akao; Koji Inoue, and Hiroyuki Osanai, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan

Filed Apr. 26, 1988, Ser. No. 186,470

Claims priority, application Japan, Apr. 28, 1987, 62-103156

Int. Cl.[4] B32B *3/04, 15/04, 27/08*

U.S. Cl. 428—34.2 **4 Claims**



1. A single-sheet gusset bag of multilayer construction for photographic photosensitive materials comprising a metal foil layer or metallized flexible sheet layer, a water-absorptive, and heat-resistant flexible sheet layer which resists dust formation selected from the group consisting of white glassine paper, coated paper, dustless paper, cellophane, synthetic pulp-blended paper, nonwoven fabric, resin saturated paper, synthetic paper, neutral paper, water-repellent paper and calendered paper, said flexible sheet layer being laminated on the outside of said metal foil layer or metallized flexible sheet layer, and a light-shielding polyolefin resin film layer containing linear low density polyethylene resin in an amount of more than 40 wt. %, a resin selected from the group consisting of homopolypropylene resin, propylene-ethylene random copolymer resin, propylene-ethylene block copolymer resin, LDPE resin, HDPE resin, EVA resin, EEA resin and polyiso-

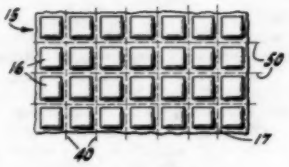
butylene resin, carbon black and an antioxidant, said film layer having a thickness of more than 50 μm and being laminated on the inside of said metal foil layer or metallized flexible sheet layer, and the bottom seal portion is turned or rolled and fixed by an adhesive or adhesive tape.

4,894,265

BUBBLE-TYPE CUSHIONING AND PACKAGING SHEET AND METHOD OF MANUFACTURE

Ted B. Chang, San Francisco, and Arthur Graham, Portola Valley, both of Calif., assignors to Free-Flow Packaging Corporation, Redwood City, Calif.

Filed Jan. 15, 1988, Ser. No. 144,529
Int. Cl.[4] B32B 3/12
U.S. Cl. 428—34.6 11 Claims



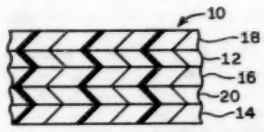
1. In a flexible cushioning sheet comprising a pair of thin films joined together to define a plurality of sealed gas bubbles therebetween, the improvement wherein each film has a thickness profile ABA where B is linear low density polyethylene, A is selected from medium density polyethylene and high density polyethylene, and the sheet has a thickness profile ABABA.

4,894,266

MULTIPLE LAYER PACKAGING SHEET MATERIAL

Frank T. Bauer, Appleton; Yong J. Kim, and Roger P. Genske, both of Neenah, all of Wis., assignors to American National Can Company, Chicago, Ill.

Continuation-in-part of Ser. No. 81,789, Aug. 5, 1987, which is a continuation-in-part of Ser. No. 802,910, Nov. 29, 1985, Pat. No. 4,764,404, which is a continuation-in-part of Ser. No. 45,003, Apr. 30, 1987. This application Dec. 23, 1987, Ser. No. 138,222
Int. Cl.[4] B29D 27/00
U.S. Cl. 428—35.4 45 Claims



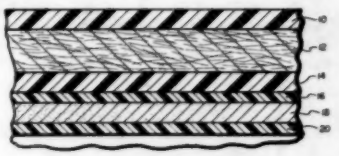
1. A multiple layer sheet material, comprising:
(a) a first layer of vinylidene chloride copolymer, said first layer having a first softening temperature;
(b) a second sealant layer having a second softening temperature no lower than 20° C. less than said first softening temperature;
(c) a third layer, between said first and second layer, said third layer having a third softening temperature greater than said first and second softening temperatures, and comprising polyethylene terephthalate;
(d) a fourth layer having a fourth softening temperature greater than said first and second softening temperatures, said first layer being between said third and fourth layers; and
(e) a fifth impact layer between said second and third layers, the composition of said impact layer comprising (i) as a first component, a base material drawn from the same family of materials as a material component comprising at least 40% by weight of said second sealant layer, and (ii) as a second component, a composition providing elastomeric properties to said impact layer and increased shock tolerance to said multiple layer sheet material.

4,894,267

BLOW-MOLDED PLASTIC BOTTLE WITH BARRIER STRUCTURE FOR FOOD PACKAGES

Griscom Bettle, III, and Christopher W. Gargano, both of Box 338, Bradenton, Fla. 33506

Filed Sep. 28, 1987, Ser. No. 101,730
Int. Cl.[4] B65D 65/38, 15/22; B32B 1/02, 27/06
U.S. Cl. 428—36.7 8 Claims



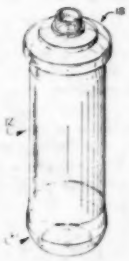
1. A blow-molded plastic bottle adapted for use as a food package, said bottle having therein a barrier structure consisting of:
a first layer of ethylene-vinyl alcohol copolymer, said first layer positioned as the innermost layer of said bottle, said first layer adapted to contact the food;
a second layer of ethylene-vinyl alcohol copolymer; and
moisture barriers adhered to both sides of said second layer of ethylene-vinyl alcohol copolymer, wherein said bottle further comprises a structural layer.

4,894,268

STRETCH BLOW-MOLDED POLYETHYLENE TEREPHTHALATE WIDE MOUTH CONTAINER AND INTERMEDIATE ARTICLE

Donald L. Greenwood, Hartsville, and Donald W. Hayward, Florence, both of S.C., assignors to Sonoco Products Company, Hartsville, S.C.

Filed Dec. 7, 1987, Ser. No. 129,706
Int. Cl.[4] B65D 1/02, 23/00
U.S. Cl. 428—36.42 16 Claims



3. An intermediate article formed by stretch blow-molding an injection-molded preform of polyethylene terephthalate for fabrication into a wide-mouth container suitable for packaging tennis balls or other contents under pressure and being characterized by a construction which will withstand internal pressures with minimal distortion at the base and by a flange construction surrounding the mouth of desired strength and thickness for receiving a closure; said intermediate article comprising:
a tubular body portion of high biaxial molecular orientation;
a base portion of low biaxial molecular orientation and inte-

grally extending from a lower end of said tubular body portion and having means for providing free-standing ability to the fabricated container and for controlling distortion by internal pressure; and

an accommodation portion integrally extending from an upper end of said tubular body portion and comprising (1) a flange of high biaxial molecular orientation extending around and radially outwardly from the upper open end of said tubular body portion and being adapted to be annularly cut at an intermediate location to remove said accommodation portion during fabrication of the wide-mouth container from said intermediate article, and (2) a stepped wall portion of decreasing biaxial molecular orientation extending around and upwardly and inwardly from said flange and including at least two successive upwardly and inwardly extending step means for collecting a quantity of polyethylene terephthalate during blow-molding and for increasing biaxial molecular orientation and controlling the thickness of said flange.

4,894,269

SYSTEM AND METHOD FOR SECURELY AFFIXING AN ELEMENT TO A STRUCTURE

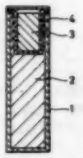
Michio Kimura, Nagoya, Japan, assignor to Nippon Decoluxe Kabushiki Kaisha, Japan

Filed Dec. 3, 1987, Ser. No. 127,811

Claims priority, application Japan, Dec. 5, 1986, 61-288938; Dec. 5, 1986, 61-288939; Mar. 3, 1987, 62-046734

Int. Cl.[4] B65D *65/28*

U.S. Cl. 428—43 **23 Claims**



1. A system for securely affixing an element to a structure formed to have a recess for receiving therein an affixation portion of said element, comprising:

a frangible first containment means formed of a first material, for containing a quantity of a second material, and shaped and sized for placement and subsequent breakage thereof inside said recess by a force applied thereto by said affixation portion also received in said recess; and

a second containment means comprising a quantity of a third material, cooperating with said first containment means to contain said second material therein until said breakage of said first containment means and for enabling a reaction between said second and third materials upon occurrence of said breakage to form a reaction product securely affixing said affixation portion of said element to said structure in said recess.

4,894,270

FOLD AND BOND FOR CONSTRUCTING CEMENT LAMINATE STRUCTURAL SHAPES

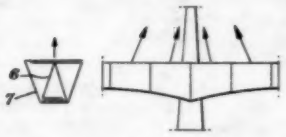
Robert L. Nicholls, Civil Engrg. Dept., Univ. of Delaware, Newark, Del. 19716

Continuation-in-part of Ser. No. 937,735, Dec. 4, 1986, abandoned. This application Dec. 7, 1987, Ser. No. 131,255

Int. Cl.[4] B05D *1/36, 5/00*; B32B *3/04, 13/00*

U.S. Cl. 428—125 **5 Claims**

1. A folded, structural member shaped from hardened, fabric-reinforced cement mortar laminates comprising a first, hardened fabric-reinforced cement mortar laminate having at least one hardened folded area, adhesively bonded to a second, hardened fabric-reinforced cement mortar laminate having a least one folded area; said folded areas of the first an second laminate including a hardened penetrant of polymer latex that



hardens said first and second laminates at said folded areas thereof.

4,894,271

METAL-CORE PRINTED WIRING BOARD AND A PROCESS FOR MANUFACTURE THEREOF

Kiyoshi Hani; Mutsuko Hayama; Yoshio Nishimoto, all of Hyogo; Hiroshi Hishiki; Minoru Kimura, both of Kanagawa, and Tatsushi Nakai, Hyogo, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed May 6, 1988, Ser. No. 190,986

Claims priority, application Japan, May 6, 1987, 62-110016

Int. Cl.[4] B32B *3/00*

U.S. Cl. 428—137 **13 Claims**

1. A metal-core printed wiring board, comprising:

(a) a metal core having a core wall defining a through hole extending between two major surfaces of said metal core;

(b) a pair of insulating layers, one of said insulating layers being formed on a respective one of said surfaces of said core, said insulating layers containing ceramic paper, wherein said ceramic paper consists essentially of short ceramic fibers having a maximum diameter of five microns and a length of 5 to 500 microns and contains 3 to 10% by weight of microfibrillated cellulose fibers as a binder for said ceramic fibers, said microfibrillated cellulose fibers having a diameter of no more than one micron;

(c) two wiring patterns, each of said wiring patterns being formed on respective ones of said insulating layers; and

(d) a through hole conductor extending through said through hole of said core for connecting said wiring patterns electrically to each other, an insulator being formed between said through hole conductor and said core wall, said insulator comprising a material which is substantially identical in composition to said ceramic paper.

4,894,272

SIMULATED TILE COUNTER TOP

William J. Aisley, Malibu, Calif., assignor to Jensen General Corp., Los Angeles, Calif.

Continuation of Ser. No. 12,439, Feb. 9, 1987, abandoned. This application Aug. 17, 1988, Ser. No. 233,906

Int. Cl.[4] B32B *3/00*

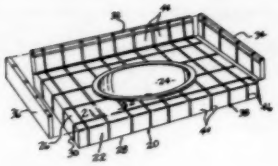
U.S. Cl. 428—156 **5 Claims**

1. A single piece single layer color tinted counter top of material formed to simulate tile and grouting therearound, said tile comprising:

a hardened single sheet single layer color tinted matrix formed with a top surface and peripheral dimension wherein said color is blended throughout said single sheet single layer;

a plurality of first parallel grooves extending in one direction along said top surface of said counter top;

a plurality of second parallel grooves extending normal to and crossing said first parallel grooves;



rectangles created between said crossing parallel grooves adopted to simulate a plurality of tiles and said grooves are adapted to simulate paths of grouting which enclose each of said simulated tile rectangles on said top surface of said single piece counter top.

4,894,273

BONDING ADDITIVES FOR REFRACTORY METALLIZATION INKS

Sheldon I. Lieberman, Burlington; Eric A. Barringer, Waltham, and Brian C. Foster, Sutton, all of Mass., assignors to Ceramics Process Systems Corp., Milford, Mass.

Continuation-in-part of Ser. No. 53,323, May 22, 1987, abandoned. This application Jun. 16, 1988, Ser. No. 207,394

Int. Cl.[4] B32B *3/10*

U.S. Cl. 428—137 **20 Claims**

1. A ceramic body essentially devoid of glass and composed of >96% alumina and having co-sintered metallization, the metallization derived from a composition having a metallizing portion consisting essentially of 84–97% refractory metal, 2–10% alumina, 0.05–5% sintering aid, and 0.5–5% bonding additive selected from the group consisting of the oxides or molybdenum, tungsten, niobium, manganese, yttrium, titanium and mixtures of such oxides.

4,894,274

PASTE-THE-WALL WALLCOVERINGS

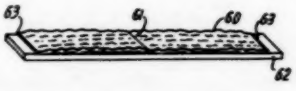
Thomas Graham, Clitheroe, and Philip G. Radford, Blackburn, both of England, assignors to Crown Decorative Products Limited, Derby, England

Filed Jul. 11, 1988, Ser. No. 217,220

Claims priority, application United Kingdom, Jul. 2, 1987, 8715533; Jul. 2, 1987, 8715535

Int. Cl.[4] D06N *7/04*

U.S. Cl. 428—151 **17 Claims**



1. A paste-the-wall wallcovering comprising a paper/plastics laminate in which the paper ply is embossed and the plastics laminate is flat, water-vapour porous, and capable of restraining the paper ply against any significant wet expansion in the course of hanging and drying of the hanging paste.

4,894,275

FLOOR MAT/FOOT PAD FOR AUTOMOBILES

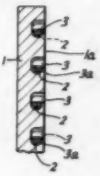
Helmut Pelzer, Neue Strasse 5, D-5804 Herdecke-Ende, Fed. Rep. of Germany

Filed Sep. 22, 1988, Ser. No. 247,908

Claims priority, application Fed. Rep. of Germany, Oct. 2, 1987, 3733286; Oct. 2, 1987, 3733285

Int. Cl.[4] B32B *3/02, 3/30*

U.S. Cl. 428—166 **2 Claims**



1. In a floor mat for automobiles made of a sound absorbing material having a back and underside, the improvement comprising:

a plurality of open pocketlike indents in the underside of said pad containing a viscous adhesive agent, the pockets having been filled with the viscous adhesive agent prior to installation of the floor mat in an automobile; and

the pockets being provided with undercut and overhung portions such that, as the pad hangs vertically for storage, the viscous material will not flow out of these open pockets.

4,894,276

BONDED GLASS FABRIC EDGE

Michael I. Bryant, Thomasville, N.C., assignor to BGF Industries, Inc., Greensboro, N.C.

Filed May 16, 1986, Ser. No. 863,725

Int. Cl.[4] D03D *5/00, 15/00, 25/00;* **D06C** *27/00*

U.S. Cl. 428—193 **9 Claims**

6. A process of bonding a feathered glass fabric edge and securing the selvage of glass fabric woven on a shuttleless loom, the process including the steps of:

(1) providing a glass yarn coated with a hot melt composition that is non-tacky and solid at about 70° F. and forms a melt at at least about 200° F., the hot melt coating constituting at least about 40% of the weight of the yarn;

(2) weaving glass warp and weft yarns into a fabric on a shuttleless loom and inserting at least one coated glass warp yarn, woven leno fashion, adjacent a longitudinal edge only of the glass fabric;

(3) heating the glass fabric woven in step (2) along the longitudinal edge at which the coated glass warp yarn was inserted and thermobonding the adjacent glass yarns thereby securing and bonding the glass yarns of the longitudinal edge of the fabric.

9. The feathered glass fabric with its edges bonded by a hot melt composition produced by the process of claim 6.

4,894,277

APPLICATION METHOD AND PRODUCTS THAT USE A FOAMED HOT MELT ADHESIVE

Toshiro Akasaki, Tokyo, Japan, assignor to Nordson Corporation, Westlake, Ohio

Continuation-in-part of Ser. No. 818,815, Jan. 14, 1986, abandoned. This application Nov. 3, 1986, Ser. No. 926,132

Claims priority, application Japan, Jan. 16, 1985, 60-6501; Apr. 26, 1985, 60-90167

Int. Cl.[4] B32B *3/26*

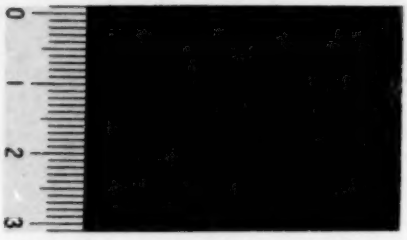
U.S. Cl. 428—198 **9 Claims**

1. A method of applying a foamable hot melt adhesive to a

first substrate for adhering said first substrate to a second substrate, comprising:

ejecting a foamable hot melt adhesive from the discharge orifice of a nozzle, and impacting said foamable hot melt adhesive ejected from said nozzle with heated air;

controlling the flow rates of said foamable hot melt adhesive and said heated air, and controlling the temperature of



said heated air, so as to form elongated strands of foamed hot melt adhesive;

depositing said elongated strands of foamed hot melt adhesive onto said first substrate so that said elongated strands form an open weave film having a spider web like configuration; and

thereafter bonding said second substrate to said first substrate.

4,894,278

PROCESS OF MANUFACTURING A DECORATIVE MIRROR

Albert Servais, Gerpinnes, and Bernard Somerhausen, Nivelles, both of Belgium, assignors to Glaverbel, Brussels, Belgium

Filed Jun. 22, 1988, Ser. No. 210,011

Claims priority, application United Kingdom, Jun. 23, 1987, 8714667

Int. Cl.[4] B05D *5/06*; B32B *3/00*

U.S. Cl. 428—201 **11 Claims**

1. A process of manufacturing a decorative mirror comprising at least one reflective silver layer provided on one face of a transparent sheet, the process comprising the steps of:

a. wetting the face of the transparent sheet with a silvering solution to form a wet layer comprised of silver thereon; and

b. contacting the wet layer, while the wet layer is still wet with the silvering solution, with randomly distributed droplets of a salt solution comprised of a metallic salt, which metallic salt reacts with silver to oxidize same or form a complex therewith, and causing reaction thereof with the silver in the wet layer to provide a first silver layer having reaction products including non-metallic silver therein, thereby creating randomly distributed areas containing reaction products including non-metallic silver within the first silver layer of the at least one reflective silver layer, whereby the visible light reflectance of the decorative mirror is modified or interrupted and wherein said silvering solution and said salt solution are made up using different solvents.

4,894,279

ELECTROEROSION PRINT MEDIA HAVING PROTECTIVE COATINGS MODIFIED WITH ORGANOTITANIUM REAGENTS

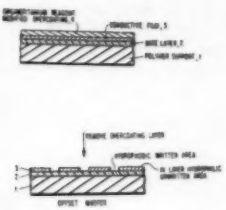
Krishna G. Sachdev, Wappingers Falls; Keith S. Pennington, Somers, and Mitchell S. Cohen, Ossining, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 9, 1986, Ser. No. 861,393

The portion of the term of this patent subsequent to Jun. 9, 2004, has been disclaimed.

Int. Cl.[4] B41C *1/10*; B41M *5/24*; G01D *15/06*

U.S. Cl. 428—216 **13 Claims**



1. An electroerosion recording material comprising:

a non-conductive support,

an electroerodible conductive layer; and

an abrasion resistant overlayer which comprises a cross-linked polymer matrix formed by interaction of a hydroxyl group-containing polymer with one or more organo-titanium reagents wherein said overlayer is dried and cured to a final dry thickness of about 0.05 μm to about 0.6 μm.

4,894,280

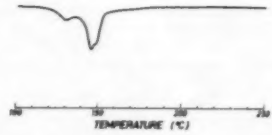
FLEXIBLE, TEAR RESISTANT COMPOSITE SHEET MATERIAL AND A METHOD FOR PRODUCING THE SAME

David W. Guthrie, Roswell, and Robert E. Weber, Marietta, both of Ga., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Filed Dec. 21, 1987, Ser. No. 136,235

Int. Cl.[4] B32B *3/00*

U.S. Cl. 428—224 **6 Claims**



1. A flexible tear resistant composite sheet material comprising:

a layer of melted and partially fused thermoplastic microfibers having a plurality of intact staple fibers having an average diameter less than or equal to 10 microns homogeneously dispersed throughout said layer, said staple fibers having an average length ranging from about 10 mm to 100 mm and a denier from about 3 to about 30, said staple fibers being present in said layer in a weight ratio of

staple fibers to microfibers ranging from 80:20 to 35:65, said staple fibers further having a melting point at least 10° C. greater than said microfibers, said composite having a plurality of voids dispersed therein such that said composite has a percent void volume of about 33 to about (percent and a slit trapezoidal tear resistance greater than or equal to 1.7 kg per 100 g/m^2 equivalent basis weight as measured in the machine direction.

4,894,281

FIBER-REINFORCED POLYMER MOLDED BODY

Kazuo Yagi, Ohtake, and Hitoshi Mantoku, Iwakuni, both of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Filed May 27, 1988, Ser. No. 199,956

Claims priority, application Japan, May 29, 1987, 62-131396; May 29, 1987, 62-131397; Jun. 26, 1987, 62-157511

Int. Cl.[4] B32B *27/04, 27/12, 27/08, 25/10*

U.S. Cl. 428—286 13 Claims

1. A fiber-reinforced polymer molded body which comprises a matrix of a polymer having a processing temperature lower than 220° C. and at least one reinforcing layer of a molecularly oriented and silane-crosslinked ultra-high-molecular-weight polyethylene fiber, wherein said reinforcing layer is laminated with or embedded in the matrix in a state where the ends of said layer are restrained, said matrix is thermally formed or thermally cured, and the reinforcing layer substantially restrains the orientation crystal structure of the molecularly oriented and silane-grafted ultra-high-molecular-weight polyethylene fiber in the molded body.

4,894,282

SAFETY IMPACT RESISTANT LAMINATES HAVING IMPROVED INTERLAYER MATERIALS

Donald G. LeGrand, Burnt Hills, and William V. Olszewski, Stillwater, both of N.Y., assignors to General Electric Company, Pittsfield, Mass.

Continuation of Ser. No. 870,664, Jun. 2, 1986, abandoned, which is a continuation of Ser. No. 652,896, Sep. 21, 1989, abandoned. This application Mar. 16, 1988, Ser. No. 169,077

The portion of the term of this patent subsequent to Jul. 28, 2004, has been disclaimed.

Int. Cl.[4] B32B *17/10, 27/36*

U.S. Cl. 428—332 2 Claims

1. A method for bonding safety and penetration resistant laminates which consists essentially of contacting under pressure a plurality of laminae selected from the group consisting of glass laminae and thermoplastic laminae where there is situated between adjacent laminae a composite pressure sensitive adhesive inner layer comprising:

(i) at least one thermoplastic sheet having a combined thickness of about 1 to 30 mils, and

(ii) a pressure sensitive adhesive sheet adhered to each face of said thermoplastic sheet.

2. A laminate produced by the method of claim 11.

4,894,283

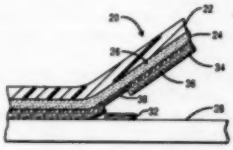
REUSEABLE THERMAL TRANSFER RIBBON

Mary A. Wehr, Hamilton, Ohio, assignor to NCR Corporation, Dayton, Ohio

Filed May 10, 1988, Ser. No. 192,794

Int. Cl.[4] B41M *5/26*

U.S. Cl. 428—341 8 Claims



1. A reuseable, thermal sensitive transfer element comprising a substrate, a functional coating containing as essential ingredients about 55% carbon black, about 35% hydrocarbon wax, and about 10% ethylene vinyl acetate copolymer, all by dry weight, and a binding layer positioned between and binding said substrate and said functional coating and containing 100% ethylene vinyl acetate copolymer, by dry weight.

4,894,284

CROSS-LINKED POLYETHYLENE-INSULATED CABLE

Shosuke Yamanouchi, Osaka; Yoshiyuki Inoue, and Masaaki Kondo, both of Kanagawa, all of Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Nov. 8, 1983, Ser. No. 549,843

Claims priority, application Japan, Nov. 9, 1982, 57-197084

Int. Cl.[4] H01B *9/02*

U.S. Cl. 428—378 6 Claims

1. A cross-linked polyethylene-insulated cable comprising a conductor core, an inner semiconductive layer, an outer semiconductive layer and an insulating layer between said inner semiconductive layer and said outer semiconductive layer, wherein the insulating layer has a thickness of at least 6 mm and is made of a cross-linked polyethylene prepared by a dry cross-linking method with 2,5-dimethyl-2,5-di(tert-butylperoxy)hexane or 2,5-dimethyl-2,5-di(tert-butylperoxy)hexyne-3 as a cross-linking agent.

4,894,285

SINTERED SPHERICAL PELLETS CONTAINING CLAY AS A MAJOR COMPONENT USEFUL FOR GAS AND OIL WELL PROPPANTS

Jeremiah J. Fitzgibbob, 415 Woodvale Ave., Apt 106B, Lafayette, La. 70503

Division of Ser. No. 40,534, Apr. 20, 1987, which is a continuation of Ser. No. 712,909, Mar. 15, 1985, abandoned, which is a continuation of Ser. No. 565,429, Dec. 27, 1983, abandoned, which is a division of Ser. No. 405,055, Aug. 4, 1982, Pat. No. 4,427,068, which is a continuation-in-part of Ser. No. 347,210, Feb. 9, 1982, abandoned. This application Dec. 2, 1987, Ser. No. 127,715

The portion of the term of this patent subsequent to Nov. 7, 2006, has been disclaimed.

Int. Cl.[4] C04B *35/02;* C09K *3/00*

U.S. Cl. 428—402 8 Claims

1. A gas and oil well proppant comprising a plurality of composite, sintered, spherical pellets having a permeability to brine at about 200° F. (93.3° C.) which decreases not more than about three-fourths when the applied pressure on said pellets is increased from 2,000 to 10,000 psi (140 to 700 kg/cm^2), said pellets being prepared from a mixture of calcined clay and calcined bauxite, said mixture containing at least 40% clay on a dry weight basis, and said pellets having an alumina to silicia ratio on a dry weight basis of from about 8.28:1 to 1.17:1, more

than 6.12 wt. % of other than alumina and silicia, a diameter of between 0.1 and about 2.5 mm, an apparent specific gravity of less than 3.40 but greater than 2.75 g/cc and a bulk density greater than 88 lbs./cubic ft., said pellets being made by a process including the steps of:

(a) forming a particular mixture of calcined clay and calcined bauxite, having an average particle size of less than 15 microns in a high intensity mixture;

(b) while stirring the mixture adding sufficient water to cause formation of composite spherical pellets from the mixture;

(c) drying the pellets at a temperature ranging from about 100° C. to about 300° C.; and

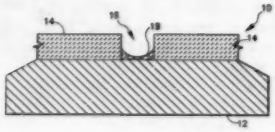
(d) furnacing the dried pellets at a furnace temperature ranging from about 1350° C. to about 1550° C. for a period sufficient to enable recovery of sintered spherical pellets.

4,894,286

OXIDATION RESISTANT REFRACTORY COATED CARBON-CARBON COMPOSITES

Paul E. Gray, La Costa, Calif., assignor to Rohr Industries, Inc., Chula Vista, Calif.

Filed Nov. 7, 1988, Ser. No. 268,015
Int. Cl.[4] B32B *9/00, 31/00*
U.S. Cl. 428—408 **12 Claims**



1. An oxygen resistant high temperature structure comprising:

a carbonous matrix;

an outer refractory coating over said matrix;

silicon, in elemental form and/or as a moiety of a compound dispersed throughout said matrix;

boron, in elemental form and/or as a moiety of a compound dispersed throughout said matrix;

titanium, in elemental form and/or as a moiety of a compound dispersed throughout said matrix;

said silicon and said boron oxidizing when exposed to a high temperature oxidizing environment to form silicon oxide and boron oxide; and

said titanium forming titanium oxide stabilizing a molten phase of the boron oxide wherein the composition range is about $0.170 \leq (Ti+Si)/B < 210$.

4,894,287

DENSIFIED CARBONACEOUS BODIES

Edward E. Hucke, Ann Arbor, Mich., assignor to Union Oil Company of California, Los Angeles, Calif.

Division of Ser. No. 568,066, Jan. 4, 1986, Pat. No. 4,503,215, which is a division of Ser. No. 305,777, Sep. 25, 1981, Pat. No. 4,425,316. This application Feb. 22, 1985, Ser. No. 704,300
Int. Cl.[4] B32B *9/00*
U.S. Cl. 428—408 **5 Claims**

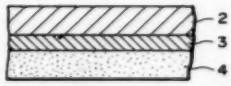
1. A densified carbonaceous body comprising: a permeable carbonaceous body, the pores of said body being filled with the pyrolyzation product of a resin obtained by polymerizing a liquid impregnant containing furfural, furfural alcohol or a mixture thereof, an acid catalyst, and a glycol or mixture of glycols.

4,894,288

THERMAL TRANSFER MATERIAL

Tsuguhiro Fukuda, and Hiroshi Sato, both of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 24, 1988, Ser. No. 197,960
Claims priority, application Japan, May 26, 1987, 62-130470
Int. Cl.[4] B41M *5/20*
U.S. Cl. 428—422 **8 Claims**



1. A thermal transfer material comprising: a support, an intermediate layer, and a heat-transferable ink layer which comprises a heat fusible material disposed in this order on the support; said intermediate layer comprising oxidized polyethylene having a number-average molecular weight of 1300–2500, and at least one species selected from the group consisting of polyoxyethylene alkylaryl ether, resin acid, and sulfuric acid ester salt.

4,894,289

LAMINATE AND MOLDED ARTICLE PREPARED THEREFROM

Yasuhiko Otawa; Kunihide Hiraoka; Toshiyuki Maeda, al of Ichihara; Katsuo Okamoto, Funabashi; Noboru Sakamaki, Ichihara, and Shizuo Shimizu, Houya, all of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Filed Oct. 30, 1987, Ser. No. 114,594
Claims priority, application Japan, Oct. 30, 1986, 61-256872; Dec. 11, 1986, 61-293482; Dec. 15, 1986, 61-296797
Int. Cl.[4] E06B *7/16*
U.S. Cl. 428—424.2 **23 Claims**

1. A laminate comprising a layer composed of (a) a partially crosslinked graft-modified polyolefin elastomer formed by dynamically heat-treating a blend comprising (i) 10 to 100 parts by weight of a peroxide-crosslinking olefin copolymer comprising olefin and non-conjugated diene, (ii) 0 to 90 parts by weight of an olefinic plastic, the sum of the amounts of the components (i) and (ii) being 100 parts by weight, and (iii) 0.01 to 10 parts by weight of an unsaturated carboxylic acid or derivative thereof, in the presence of an organic peroxide, and a layer of (b) a polyamide, polyurethane or polyester.

4,894,290

COATED GLASS

Peter Chesworth, Burscough Town, and Martin Lowe, Wigan, both of England, assignors to Pilkington Brothers P.L.C., Helens, England

Division of Ser. No. 8,377, Jan. 29, 1987, Pat. No. 4,749,397. This application Jan. 13, 1988, Ser. No. 143,195
Claims priority, application United Kingdom, Jan. 29, 1986, 8602128; Dec. 18, 1986, 8630254
Int. Cl.[4] C23C *13/00;* **C03C** *17/36;* **C08J** *7/06*
U.S. Cl. 428—426 **16 Claims**

1. A coated glass substrate with a coating comprising a layer

of additional metal selected from aluminum, titanium, zinc, tantalum and zirconium, a silver layer from 5 nm to 30 nm thick over the layer of additional metal, a further layer of additional metal selected from aluminum, titanium, zinc, tantalum and zirconium over the silver layer, and an anti-reflection metal oxide layer over said further layer of additional metal which coated glass substrate, when subjected to a bending and/or toughening cycle in which the glass is heated in air to a temperature above the softening temperature of the glass, develops an increased light transmission, with the thickness of any anti-reflection metal oxide layer overlying the silver layer plus the thickness of the oxidised additional metal over the silver being in the range of from 10 nm to 80 nm.

4,894,291

INCREASED REGRIND USAGE IN COEXTRUDED STRUCTURES

David E. Ofstein, Williamsburg, Va., assignor to Rampart Packaging Inc., Williamsburg, Va.

Filed Jan. 28, 1988, Ser. No. 149,279

Int. Cl.[4] B32B *27/08*

U.S. Cl. 428—518 **17 Claims**

1. A laminate for use in oxygen barrier applications which comprises:

(a) a protective outer layer made of a material selected from the group consisting of polypropylene, polyethylene and copolymers of propylene and ethylene;

(b) an adhesive layer;

(c) an inner barrier layer made of a material selected from the group consisting of ethylene vinyl alcohol copolymers and polyvinylidine chloride;

(d) interposed between layers (a) and (b), an intermediate regrind layer formed of a blend of the materials from which layers (a), (b) and (c) are formed; and

(e) interposed between layers (a) and (d), a buffer layer which is formed from a blend of the materials from which layers (a) and (d) are formed and which comprises from about 5% to about 100% of the material of layer (d).

4,894,292

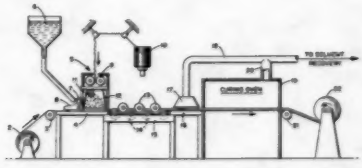
THERMOSETTING PHENOLFORMALDEHYDE SHEET MOLDING COMPOSITIONS AND METHOD OF PREPARATION

Jeno J. Diburz, Mercer Island, Wash., and Leland R. Miller, Auburn, Me., assignors to Reichhold Chemicals Inc., White Plains, N.Y.

Continuation of Ser. No. 733,537, May 13, 1985, abandoned, which is a continuation of Ser. No. 469,452, Feb. 24, 1983, abandoned, which is a continuation-in-part of Ser. No. 381,502, May 24, 1982, abandoned, which is a continuation of Ser. No. 170,167, Jul. 18, 1980, abandoned. This application Jul. 25, 1986, Ser. No. 888,638

Int. Cl.[4] R29C *39/14*

U.S. Cl. 428—524 **29 Claims**



1. A flexible fibrous reinforced "B" stage phenol-formaldehyde sheet molding composition in the form of a flexible sheet and capable of rapid curing to an infusible state, said composition formed in the absence of cementaceous material or a reactive divalent base thickening agent, from a mixture consisting essentially of:

(a) a resin composition containing from about 30 to about 70 weight percent resin solids of a phenol-formaldehyde condensate resin blend comprising a water soluble phenol-formaldehyde resin solution having a formaldehyde-to-phenol ratio of about 1.2–1.8:1.0, and a solid phenol-formaldehyde resin having a formaldehyde-to-phenol ratio of about 0.6–2.2:1.0;

(b) about 15 to 30 percent by weight of a miscible organic solvent;

(c) from about 20 to about 40 percent by weight of an inert filler;

(d) from about 0.5 to about 5.0 percent by weight of an internal lubricant;

(e) from about 0.5 to about 5.0 percent by weight of a catalyst capable of polymerizing the phenol-formaldehyde condensate resin; and

(f) from about 1 to about 50 percent by weight of a fibrous reinforcing material based on the weight of the sheet molding composition; said composition being in the form of a flexible sheet in a partially cured non-tacky moldable state with the fibrous material dispersed therein, and having stable properties for several months when stored at temperatures of about 32° to 36° F.

4,894,293

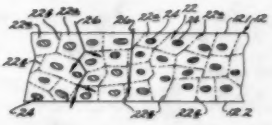
CIRCUIT SYSTEM, A COMPOSITE METAL MATERIAL FOR USE THEREIN, AND A METHOD FOR MAKING THE MATERIAL

Henry F. Breit, Attleboro; Karen A. Auguston, Brighton, both of, and Joseph M. Gondusky, Warwick, R.I., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 10, 1988, Ser. No. 166,290

Int. Cl.[4] C22C *9/00*

U.S. Cl. 428—614 **19 Claims**



1. A composite metal material comprising a continuous matrix of a first metal material securing a plurality of discrete elements of other metal materials in dispersed relation therein, the discrete elements embodying ferrous metal materials having relatively low coefficient of thermal expansion for cooperating with the continuous matrix material to provide the composite metal material with a selected coefficient of thermal expansion relatively much lower than that of the continuous matrix material, characterized in that the continuous metal matrix material comprises a copper material of relatively high thermal conductivity substantially free of ferrous metal constituents therein for providing the composite metal material with an improved effective thermal conductivity between opposite surfaces of the composite metal material.

4,894,294

ELECTROLYTIC SOLUTION SUPPLY TYPE BATTERY

Koichi Ashizawa, Tokyo; Hideharu Ogino, Matsudo, and Shunji Shimizu, Tokyo, all of Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan

Filed May 30, 1985, Ser. No. 739,557

Claims priority, application Japan, Jun. 5, 1984, 59-114738; Apr. 11, 1985, 60-54198[U]

Int. Cl.[4] H01M *8/24*

U.S. Cl. 429—18 **3 Claims**

1. An electrolytic solution supply type battery comprising:

a plurality of unit cells which are electrically series-connected or stacked;

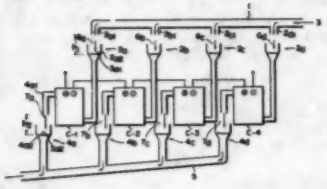
a plurality of distribution liquid path means for supplying an

electrolytic solution to each of said plurality of unit cells from a common supply path;

a plurality of exhaust liquid path means for exhausting the electrolytic solution from each of said plurality of unit cells to a common exhaust path; and

a liquid flow interrupt means formed at least at one of said distribution and exhaust liquid path means for obtaining discontinuity of the electrolytic solution by natural fall so as to prevent liquid short-circuit between each two adjacent unit cells of said plurality of unit cells;

each of said liquid flow interrupt means including upper and lower pipes for a corresponding one of said distribution or exhaust liquid path means, said upper and lower pipes being vertically separated from each other by a predetermined natural fall distance for obtaining said discontinuity of the electrolytic solution, and an upper end of said lower pipe having an enlarged diameter for receiving the falling electrolytic solution;



each of said liquid flow interrupt means having a liquid collection chamber at a lower end of said upper pipe, said liquid collection chamber comprising:

an upper portion and a lower portion;

a first partition means arranged in said upper portion to extend parallel to a flow of the electrolytic solution and to define a plurality of upper divided chambers for equally dividing a flow amount of the electrolytic solution into at least two substantially equal parts;

a second partition means arranged in said lower portion in a direction substantially perpendicular to said first partition means to define a plurality of lower divided chambers which equally divide an interior of said lower portion into the same number of parts into which the upper portion is divided by said first partition means, each of said lower divided chambers having a liquid fall port means for allowing the electrolytic solution to fall therethrough, and each of said upper divided chambers being in communication with a corresponding one of said lower divided chambers.

4,894,295

METAL-ALLOY AIR BATTERY

Michael C. Cheiky, 1776 Eucalyptus Hill, Santa Barbara, Calif. 93103

Filed Sep. 14, 1988, Ser. No. 244,828
Int. Cl.[4] H01M *4/00*
U.S. Cl. 429—77 **19 Claims**

1. A metal-air battery, comprising: a base having a base cavity therein and having a flexible, substantially concave non-planar bottom surface;

a lid located on top of said base cavity and joined with said base, said lid including:

at least one air chamber housing that encloses an air chamber through which air may pass;

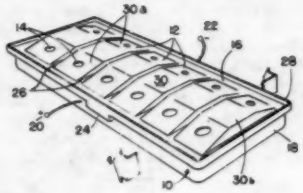
at least one inlet duct in said air chamber housing for allowing air to pass into said air chamber housing;

at least one outlet duct in said air chamber housing for allowing air to pass out of said air chamber housing;

an anode located in said base cavity;

an electrolyte located in said base cavity in chemical reactive proximity to said anode;

an air cathode located near the junction between said base and said lid, said air cathode being in chemical reactive proximity to said electrolyte;



a negative terminal connected to said anode; and

a positive terminal connected to said cathode.

4,894,296

CATHODE FOR ZINC AIR CELLS

Alex Borbely, Framingham, Mass., and Jayaal Molla, Santa Clara, Calif., assignors to Duracell Inc., Bethel, Conn.

Filed Oct. 27, 1987, Ser. No. 113,708
Int. Cl.[4] H01M *4/00*; B29C *59/00*
U.S. Cl. 429—27 **19 Claims**

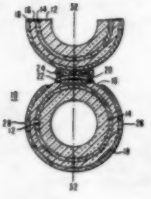
1. A zinc-air electrochemical cell having an anode comprised of zinc, an alkaline electrolyte, and a hydrophobic cathode; wherein hydrophobic the cathode comprises an admixture of discrete particles of gamma manganese dioxide and carbon and at least 20% of a polymeric halogenated hydrocarbon binder.

4,894,297

ELECTROCHEMICAL GENERATOR APPARATUS CONTAINING MODIFIED FUEL ELECTRODES FOR USE WITH HYDROCARBON FUELS

Prabhakar Singh, Pittsburgh; Roswell J. Ruka, Churchill, and Raymond A. George, Pittsburgh, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 7, 1988, Ser. No. 280,908
Int. Cl.[4] H01M *8/10*
U.S. Cl. 429—31 **15 Claims**



1. An electrochemical generator apparatus (**30**), containing an electrochemical cell assembly comprising at least one electrochemical cell (**10**) containing a fuel electrode (**18**), where a fuel (**46**) containing hydrocarbons contacts the fuel electrode, the improvement characterized in that the fuel electrode is impregnated with chemicals which form metal oxides upon heating, where the metal of the oxide is selected from the group consisting of Mg, Ca plus Al, Sr plus Al, Zr, Y, Ce, and mixtures thereof.

4,894,298

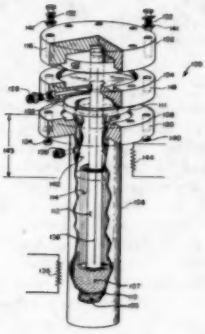
ALKALI AND HALOGEN RECHARGEABLE CELL WITH REACTANT RECOMBINATION

Stephen P. Vukson, Tipp City; David H. Fritts, Dayton; John F. Leonard, and Kwang Y. Kim, both of Beavercreek, all of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Oct. 24, 1988, Ser. No. 261,802

Int. Cl.[4] H01M *10/39*

U.S. Cl. 429—50 25 Claims



1. A rechargeable sodium and sulfuryl chloride secondary electrical battery cell comprising the combination of:

an enclosed vessel;

a first sodium inclusive anode reactant material disposed in a first receptacle portion of said vessel;

a second sulfuryl chloride catholyte reactant material disposed in a second receptacle lower portion of said vessel;

a sodium ion transporting solid electrolyte member disposed between said first and second receptacle portions and thereby between said reactant materials in said vessel;

reactant recombination means including a vacated chamber disposed in the upper portion of said enclosed vessel for storing and recombining gaseous reaction products of the cell discharging reaction between said first and second reactant materials and the cell charging reaction regeneration of said reactant materials and for returning said recombined reaction products to said vessel second receptacle portion;

means for controlling the temperature of said first and second receptacle portions of said vessel at a first predetermined reaction enabling temperature;

means for controlling the temperature of said recombination chamber upper portion of said enclosed vessel at a second lower predetermined recombination enabling temperature.

4,894,299

CELL HAVING A DOME-SHAPED SOLID CERAMIC ELECTROLYTE

Elliott M. Morse, Joplin, Mo., assignor to Eagle-Picher Industries, Inc., Cincinnati, Ohio

Filed Dec. 2, 1988, Ser. No. 279,035

Int. Cl.[4] H01M *6/20*

U.S. Cl. 429—104 15 Claims

1. An electrochemical cell comprising, in sequential adjoining order,

a first current collector,

anode material contained in an anode chamber,

a solid, ionically conductive ceramic electrolyte,

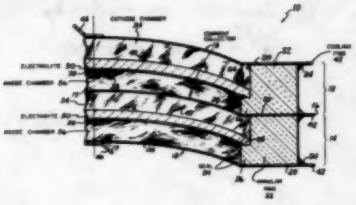
cathode material contained in a cathode chamber, and

a second current collector; and

annular means surrounding and closing said anode and cathode chambers,

said anode and cathode materials being electrochemically active during operation of the cell,

said electrolyte formed of a ceramic material across which ions are transferred during discharge of the cell from one said chamber to the other said chamber,



said electrolyte and first and second current collectors all being in the form of domed disks of substantially similar curvature,

said electrolyte and current collectors being axially aligned but spaced apart, to present said chambers between them.

4,894,300

SEALED MAINTENANCE-FREE LEAD-ACID STORAGE BATTERY

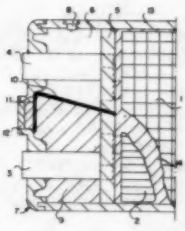
Wolgang Kugler, Ortenberg, Fed. Rep. of Germany, assignor to Accumulatorenfabrik Sonnenschein GmbH, Budingen, Fed. Rep. of Germany

Filed Aug. 19, 1988, Ser. No. 234,077

Claims priority, application Fed. Rep. of Germany, Aug. 20, 1987, 3727763

Int. Cl.[4] H07M *6/14*

U.S. Cl. 429—190 9 Claims



1. A sealed, maintenance-free lead-acid storage battery of high capacity employing a thixotropic sulfuric acid gel as the electrolyte, comprising positive and negative electrode plates which are separated by a separator and connected to a positive and a negative terminal, respectively, and further comprising a gel layer on top of the electrode plates and therebetween, and having a free gas space on top of the gel layer, and a housing lid and a pressure relief valve confronting on said free gas space, and characterized by

(a) the storage battery being horizontally arranged, the positive terminal thereof being disposed in the lower portion of said battery and said free gas space, and the pressure relief valve being disposed in the upper portion of said battery,

(b) the lower portion of said free gas space containing the positive terminal being filled with electrolyte-resistant and electrolyte-impermeable material, and

(c) a parting angle piece extending transversely across the free gas space, said angle piece operatively separating said

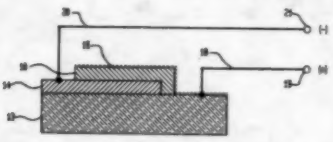
upper portion of said free gas space from the lower, material containing portion thereof.

4,894,301

BATTERY CONTAINING SOLID PROTONICALLY CONDUCTING ELECTROLYTE

Christopher K. Dyer, Chatham Township, Morris County, N.J., assignor to Bell Communications Research, Inc., Livingston, N.J.

Filed Aug. 3, 1989, Ser. No. 389,507
Int. Cl.[4] H07M 6/16
U.S. Cl. 429—193 **15 Claims**



1. A rechargeable battery comprising

positive electrode means including a first metal species,

negative electrode means including a second metal species,

and a solid electrolyte including protonically conducting hydrated aluminum oxide between and in contact with said positive and negative electrode means,

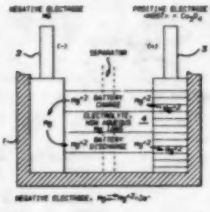
said negative electrode means being responsive to an external charging source connected to said positive and negative electrode means to form a metal hydride and capable, during a discharging cycle, to supply protons to said solid electrolyte and to supply electrons to an external load connected to said positive and negative electrode means.

4,894,302

ALKALINE EARTH METAL ANODE-CONTAINING CELL HAVING ELECTROLYTE OF ORGANOMETALLIC ALKALINE EARTH METAL SALT AND ORGANIC SOLVENT

Ronald J. Hoffman; Richard C. Winterton, and Thomas D. Gregory, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 744,827, Jun. 14, 1985. This application Dec. 1, 1986, Ser. No. 936,531
Int. Cl.[4] H01M 6/14; C07F 5/02
U.S. Cl. 429—194 **11 Claims**

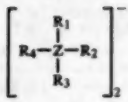


1. In an electrochemical cell containing an alkaline earth metal anode, an intercalation cathode, and a nonaqueous, liquid electrolyte, the improvement comprising:

using as said electrolyte

(A) at least one organic solvent and

(B) at least one electrolytically active alkaline earth metal salt represented by the formula:



(I)

(II)

in which Z is selected from the group consisting of boron and aluminum; X is selected from the group consisting of phosphorus and arsenic; M is an alkaline earth metal; and in which R_1–R_6 can be the same or different and are radicals independently selected from the group consisting of unsubstituted or inertly substituted alkyl, aryl, aralkyl, alkaryl, alkenyl, cycloalkyl, allyl, heterocyclic alkyl, and cyano groups with the proviso that R_1–R_6 cannot be all alkyl or all aryl and triarylalkylborate or aluminate anions and trialkylarylborate or aluminate anions are excluded.

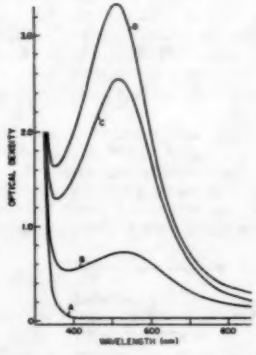
wherein said intercalation cathode is capable of containing an intercalated ionic species in its structure.

4,894,303

HIGH ENERGY BEAM-SENSITIVE GLASSES

Che-Kuang Wu, Riverside, Calif., assignor to Canyon Materials Research & Engineering, Riverside, Calif.

Division of Ser. No. 619,809, Jun. 24, 1984, Pat. No. 4,670,366, which is a continuation-in-part of Ser. No. 507,681, Jun. 24, 1983, Pat. No. 4,567,104. This application Jun. 1, 1987, Ser. No. 57,349
The portion of the term of this patent subsequent to Jun. 2, 2004, has been disclaimed.
Int. Cl.[4] G03C 1/36, 1/04, 1/49
U.S. Cl. 430—13 **68 Claims**



1. A photo tool used in photolithographic processes comprising a glass plate bearing a recorded image readable in actinic radiation, said glass plate having an integral ion-exchanged surface layer (IIES layer) bearing the recorded image, said IIES layer composed of a glass layer of a glass composition that has been ion-exchanged with an acidic aqueous solution containing soluble ionic silver to diffuse silver ions into said glass layer to render said IIES layer sensitive to high energy beams, said glass composition comprising of at least one alkali metaloxide selected from the groups of Li_2O, Na_2O,

K_2O, Cs_2O and Rb_2O, at least one photosensitivity inhibitor and/or RS-Suppression agent, SiO_2, and up to saturation of chloride in its glass melts, said IIES layer having Ag^+ ions therein and/or a large number of AgCl-containing and/or Ag_2O-containing and/or Ag^+ ion-containing microcrystals and/or microphases therein, containing silanol groups and/or water in the concentration range between about 0.01–12% by weight H_2O, the concentrations of alkali metal ions in said IIES layer being less with an increase in the concentrations of Ag^+ ions, said IIES layer containing at least a portion of the amount of the photosensitivity inhibitors, the RS-Suppression agents, the glass network formers and chloride contained in said glass composition, the glass composition containing a sufficient amount of the photosensitivity inhibitors to render the IIES layer insensitive to at least the spectral portion of the actinic radiation having wavelengths longer than 300 nm, the surface quality and surface figure of said IIES layer remaining substantially the same before and after ion exchange reactions, said IIES layer having been exposed to high energy beams in a predetermined pattern to reduce at least a portion of the silver ions of said IIES layer to elemental silver to produce the recorded image.

4,894,304

PHOTOSENSITIVE MEMBER WITH MAGNESIUM FLUORIDE DISPERSED IN TRANSPARENT PROTECTIVE RESIN LAYER

Hideaki Ueda, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Nov. 4, 1988, Ser. No. 267,295
Claims priority, application Japan, Nov. 6, 1987, 62-281788
Int. Cl.[4] G03G *5/14, 5/04*
U.S. Cl. 430—58 **6 Claims**

1. A photosensitive member with a transparent protective resin layer formed on a photoconductive layer formed over an electrically conductive substrate, wherein the transparent protective resin layer comprises magnesium fluoride of 1 μm or less in maximum particle size and of 0.1 μm or less in mean particle size dispersed in resin at the content of 5–60% by weight to the resin.

4,894,305

CARRIER AND DEVELOPER COMPOSITIONS GENERATED FROM FLY ASH PARTICLES

Robert J. Hagenbach, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 611,294, May 17, 1984, abandoned. This application Apr. 11, 1986, Ser. No. 850,650
Int. Cl.[4] G03G *9/10, 9/14;* C03G *49/08*
U.S. Cl. 430—106.6 **71 Claims**

1. Spherical carrier compositions prepared from fly ash and comprised of particles with an average particle diameter of greater than 44 microns, a magnetic moment of from about 60 to about 70 electromagnetic units per gram, and an apparent density of equal to, or greater than about 2.4 grams/cm^3.

4,894,306

ION DEPOSITION PRINTING PAPER

H. Herbert Schubring, Island Pond, Vt., assignor to James River Corporation of Virginia, Oakland, Calif.

Filed Jul. 28, 1986, Ser. No. 890,824
Int. Cl.[4] G03G *13/16*
U.S. Cl. 430—126 **4 Claims**

1. In the ion deposition printing process wherein a digital signal is converted to an image in the form of an electrostatic charge which is transferred by ion deposition to a dielectric drum, and the image is developed by a toner which is fused to a sheet of paper, the improvement wherein the paper contains an antistatic composition comprising a water-soluble electrolytic salt and water-miscible organic solvent for the salt, the solvent having a boiling point greater than about 190° C., and the paper having a surface resistivity between about 10^9 and 10^{12} ohms/cm^2.

4,894,307

PROCESSES FOR PREPARING AND CONTROLLING THE FRACTIONATION OF CHALCOGENIDE ALLOYS

Santokh S. Badesha, Pittsford; Geoffrey M. T. Foley, and Paul Cherin, both of Fairport, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Nov. 4, 1988, Ser. No. 270,184
Int. Cl.[4] G03G *5/082*
U.S. Cl. 430—128 **35 Claims**

1. A process for the preparation of chalcogenide alloys which comprises providing a chalcogenide alloy source component, crystallizing the source component, admixing the crystallized source component with an organic component, and evaporating the source component in the presence of the organic component.

4,894,308

PROCESS FOR PREPARING ELECTROPHOTOGRAPHIC TONER

Hadi K. Mahabadi, Mississauga; Sheau V. Kao; Gerald R. Allison, both of Oakville, all of Canada; Hui Chang, Pittsford, and Edward J. Gutman, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Oct. 17, 1988, Ser. No. 259,239
Int. Cl.[4] G03G *9/08*
U.S. Cl. 430—137 **35 Claims**

1. A process for preparing a toner composition which comprises (1) premixing a pigment and a charge control additive in the absence of a solvent; (2) subsequently admixing the premixed pigment and charge control additive obtained in step 1 with a resin; and (3) extruding the mixture of pigment, charge control additive, and resin obtained in step 2.

4,894,309

PROCESSES FOR THE PREPARATION OF CROSSLINKED COPOLYMERS

Michael K. Georges, Guelph; Lupu Alexandru, Toronto; William J. Dale, Scarborough; Paul D. Szabo, Weston, all of Canada, and Robert A. Nelson, Webster, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Sep. 19, 1988, Ser. No. 246,070
Int. Cl.[4] G03G *9/08*
U.S. Cl. 430—137 **11 Claims**

1. A toner composition comprised of the resin particles of crosslinked styrene butadiene ternary copolymers prepared by a free radical suspension polymerization process which comprises the polymerization of styrene monomers, butadiene monomers, and crosslinked components in the presence of a surfactant, a stabilizer, and a first and second initiator; and wherein the aforementioned components are present in an aqueous phase; heating the resulting aqueous mixture at a temperature of from about 50° C. to about 110° C. thereafter heating the mixture at a temperature of from about 110° C. to about 150° C.; followed by cooling; and isolating the desired product, second toner resin particles, pigment particles, a low molecular weight wax component, and a charge enhancing additive.

4,894,310

PHOTO-SENSITIVE RECORDING MEDIUM

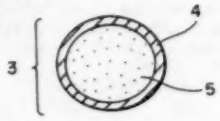
Jun Sakai, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Dec. 27, 1988, Ser. No. 290,650

Claims priority, application Japan, Dec. 28, 1987, 62-333336; Jan. 14, 1988, 63-5941

Int. Cl.[4] G03C 1/72

U.S. Cl. 430—138 **5 Claims**



1. A photo-sensitive recording medium comprising:
a sheet shaped supporting member; and
microcapsules coated on said supporting member, each of said microcapsules comprising a capsule wall made of an inorganic material and enveloping therein a photo-curing substance and a color component.

4,894,311

POSITIVE-WORKING PHOTORESIST COMPOSITION

Kazuya Uenishi; Yasumasa Kawabe, and Tadayoshi Kokubo, all of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

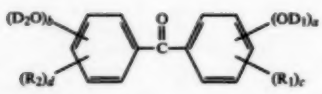
Filed Oct. 29, 1987, Ser. No. 113,951

Claims priority, application Japan, Oct. 29, 1986, 61-257525

Int. Cl.[4] G03C 1/54, 1/60

U.S. Cl. 430—192 **8 Claims**

1. A positive-working photoresist composition for fine photofabrication comprising an alkali-soluble novolak resin in admixture with at least one photosensitive compound represented by formula (I)



(I)

wherein D_1 and D_2, which may be the same or different, each represents a 1,2-naphthoquinonediazido-5-sulfonyl group or a 1,2-naphthoquinonedizido-4-sulfonyl group; R_1 and R_2, which may be the same or different, each represents an alkoxy group, or an alkyl ester group, and a, b, c, and d each is 0 or an integer from 1 to 5, provided that $(a+b) \geqq 1$ and $(c+d) \geqq 1$, wherein said resin and said photosensitive compound are present in sufficient amounts to provide a positive resist pattern.

4,894,312

DYE DIFFUSION PROCESS WITH BASE PRECURSOR SALTS OF STRONG ORGANIC BASES AND WEAK ORGANIC ACIDS

Holger Ohst, Bergisch Gladbach; Carlhans Süling, Odenthal; Günther Schenk, Cologne; Kaspar Wingender; Manfred Peters, both of Leverkusen, and Immo Boie, Leichlingen, all of Fed. Rep. of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

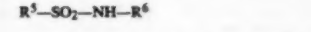
Filed Jun. 3, 1988, Ser. No. 201,948

Claims priority, application Fed. Rep. of Germany, Jun. 13, 1987, 3719765

Int. Cl.[4] G03C 5/54

U.S. Cl. 430—203 **6 Claims**

1. Process for the production of color images by the photographic dye diffusion process in which a first light-sensitive sheet material is imagewise exposed, at least one of said first light-sensitive sheet material and a second light-insensitive sheet material is moistened with an aqueous liquid and the two sheet materials are heated to 50°–120° C. with their coated surfaces in contact and then separated, said first light-sensitive sheet material containing, on a layer support, at least one light-sensitive silver halide emulsion layer and at least one color providing compound which is capable of producing an image-wise distribution of a diffusible dye on development and said second light-insensitive sheet material containing in at least one binder layer a base precursor compound wherein said base precursor compound is a salt of a weakly acidic organic compound and a strong organic base and said weakly acidic compound corresponds to the following formula II:



$$R^5—SO_2—NH—R^6 \qquad \text{II}$$

wherein R^5 stands for alkyl, aryl or a heterocyclic group and R^6 stands for R^5 or hydrogen.

4,894,313

PHOTOSENSITIVE RECORDING ELEMENT COMPRISING MIGRATION RESISTANT DYES

Peter Neumann, Wiesloch, and Guenter Wallbillich, Neustadt, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed May 12, 1987, Ser. No. 48,751

Claims priority, application Fed. Rep. of Germany, May 31, 1986, 3618373

Int. Cl.[4] G03C 1/495, 1/68, 1/70, 1/76

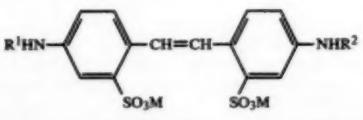
U.S. Cl. 430—271 **4 Claims**

1. A photosensitive recording element for the production of printing plates, relief plates or resist images, which consists essentially of

(a) a dimensionally stable base, and

(b) a solid photopolymerizable or photodegradable recording layer on the base and developable with a liquid developer,

said photosensitive recording element containing in the recording layer (b) in concentrations graduating over the layer thickness, one or more light-absorbing, unreactive, migration resistant compounds of the formula (I)



(I)

where M is a hydrogen atom or proton, an alkali metal cation, the ammonium cation or an amine cation and R^1 and R^2 are identical or different and are each a substituted s-triazine ring.

2. A photosensitive recording element as defined in claim 1, which has one or more intermediate layers (c) between the base and the recording layer in which the light-absorbing, unreactive compound is present in a concentration which differs from that in the photosensitive recording layer.

4,894,314

PHOTOINITIATOR COMPOSITION CONTAINING BIS KETOCOUMARIN DIALKYLAMINO BENZOATE, CAMPHORQUINONE AND/OR A TRIPHENYLIMIDAZOLYL DIMER

Robert Barr, Huntington Beach; Leo Roos, Laguna Beach, and Lawrence Crane, Tustin, all of Calif., assignors to Morton Thiokol, Inc., Chicago, Ill.

Continuation of Ser. No. 43,054, Apr. 27, 1987, abandoned, which is a continuation-in-part of Ser. No. 930,686, Nov. 12, 1986, abandoned. This application Nov. 16, 1988, Ser. No. 273,757

Int. Cl.[4] G03C 1/68, 1/70

U.S. Cl. 430—281 **35 Claims**

1. A composition for initiating and sensitizing the photopo-

lymerization or photocrosslinking of ethylenically unsaturated photocurable materials, said composition comprising:
(a) 3,3'-carbonyl bis(7-diethylaminocoumarin);
(b) an alkyl ester of p-dialkylamino benzoic acid; and
(c) a compound selected from the group consisting of camphorquinone and a 2,4,5-triphenylimidazolyl dimer.

7. A composition for initiating and sensitizing the photopolymerization or photocrosslinking of ethylenically unsaturated photocurable materials, said composition comprising:
(a) 3,3'-carbonyl bis(7-diethylaminocoumarin);
(b) an alkyl ester of p-dialkylamino benzoic acid;
(c) camphorquinone; and
(d) a 2,4,5-triphenylimidazolyl dimer

12. In a photopolymerizable composition comprising an addition polymerizable compound containing ethylenic unsaturation, and a photopolymerization initiating and sensitizing composition, the improvement wherein the photopolymerization initiating and sensitizing composition comprises:
(a) 3,3'-carbonyl bis(7-diethylaminocoumarin);
(b) an alkyl ester of p-dialkylamino benzoic acid; and
(c) a compound selected from the group consisting of camphorquinone and a 2,4,5-triphenylimidazolyl dimer.

18. In a photopolymerizable composition comprising an addition polymerizable compound containing ethylenic unsaturation, and a photopolymerization initiating and sensitizing composition, the improvement wherein the photopolymerization initiating and sensitizing composition comprises:
(a) 3,3'-carbonyl bis(7-diethylaminocoumarin);
(b) an alkyl ester of p-dialkylamino benzoic acid;
(c) camphorquinone; and
(d) a 2,4,5-triphenylimidazolyl dimer.

4,894,315

PROCESS FOR MAKING FLEXOGRAPHIC PRINTING PLATES WITH INCREASED FLEXIBILITY

Bernard Feinberg, Englishtown; Michael Fryd, Moorestown, both of N.J., and Ernst Leberzammer, Glen Mills, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 30, 1988, Ser. No. 238,105
Int. Cl.[4] G03C *1/68, 7/00*
U.S. Cl. 430—281 **11 Claims**

1. In a process for making a printing relief from a flexographic photosensitive element comprising:
(a) imagewise exposing to actinic radiation a layer of a photosensitive composition, said photosensitive composition comprising a binder having thermoplastic and elastomeric domains, a first addition polymerizable, ethylenically unsaturated monomer having some compatibility with both domains of the binder and an addition polymerization initiator or initiating system;
(b) removing the unexposed portions; and
(c) applying post development treatment; wherein the improvement comprises increasing the flexibility of the flexographic printing relief by adding at least one additional ethylenically unsaturated monomer which produces a hard polymer when photopolymerized, said monomer being substantially incompatible with the elastomeric domain of the binder, the ratio of first monomer to the additional monomer is in the range 1:4 to 4:1 based on total weight of monomer, and said additional monomer is added to the photosensitive composition prior to imagewise exposing the layer.

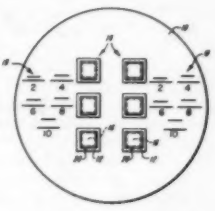
4,894,316

ADJUSTMENT OF THIN FILM CAPACITORS

Richard A. Hjulstrom, Kingston, N.Y., assignor to Electro-Films, Inc., Warwick, R.I.

Filed Jun. 22, 1988, Ser. No. 210,034
Int. Cl.[4] G03C *5/00*
U.S. Cl. 430—316 **2 Claims**

1. A method for adjusting during fabrication the capacitance value of thin film capacitors formed on a substrate, comprising the steps of:
providing a first plurality of adjustment patterns on a mask which defines metallized capacitor plate areas of thin film capacitors;
using said mask to form said capacitor plate areas and a second plurality of adjustment patterns on the substrate;



aligning selected portions of said first plurality of adjustment patterns on said mask and said second plurality of adjustment patterns on said substrate to provide an intended offset between said mask-defined capacitor plate areas and said capacitor plate areas formed on the substrate, which offset defines portions of said capacitor plate areas formed on the substrate; and
removing said offset-defined portions of said capacitor plate areas.

4,894,317

METHOD OF FORMING A PRINTED CIRCUIT AND THE PRINTED CIRCUIT FORMED THEREFROM

Tsutomu Maruyama, and Tadaaki Satoh, both of Hiratsuka, Japan, assignors to Kansai Paint Co., Ltd., Amagasaki, Japan

Filed Apr. 1, 1988, Ser. No. 176,466
Claims priority, application Japan, Apr. 2, 1987, 62-82134
Int. Cl.[4] G03C *11/00, 5/00*
U.S. Cl. 430—319 **3 Claims**

1. A method of forming a printed circuit, comprising the steps of:
coating a photo-curable resin coating composition, comprising a photo-curable or ionizing radiation-curable powder coating composition containing a thermoplastic resin selected from a group consisting of (1) vinyl or acrylic polymer having polymerizable unsaturated group on the side chain; (2) polyester or polyether having polymerizable unsaturated group on the side chain or terminal; (3) unsaturated polyester prepared by use of polybasic acid; (4) unsaturated epoxy ester prepared from unsaturated acid and epoxy resin; (5) polyurethane prepared by using unsaturated acid or unsaturated alcohol as one component; (6) melamine resin prepared by introducing unsaturated group; (7) oil-modified alkyd resin and oil-modified aminoalkyd resin having polymerizable unsaturated group; and (8) silicone-modified resin having polymerizable unsaturated group, onto a copper foil plated insulative plate, said thermoplastic resin being in a solid state at normal temperature and having 0.5 to 5 of a polymerizable unsaturated group per 1000 of number average molecular weight, as a film-forming component;
heat-fusing the powder coating composition coated on the insulative plate to a fused liquid state;
exposing the coated plate to light through a pattern mask;
removing a non-exposed area of the coated plate followed by developing an exposed area to form a resist film;
metal plating exposed copper foil;
removing the resist film; and
removing the resulting exposed copper foil.

4,894,318

SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL COMPRISING A MAGENTA COUPLER AND A FORMALDEHYDE SCAVENGER AND METHOD OF PROCESSING THEREFOR

Jun Arakawa, and Keiji Mihayashi, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 13, 1986, Ser. No. 862,870

Claims priority, application Japan, May 13, 1985, 60-101077; Dec. 13, 1985, 60-280374

Int. Cl.[4] G03C 7/40, 7/32

U.S. Cl. 430—372 **50 Claims**

1. A silver halide color photographic material comprising a support having thereon at least one silver halide emulsion layer, wherein the silver halide color photographic material contains an uncolored magenta coupler and at least one compound capable of reacting with and fixing formaldehyde vapor, and at least 70 mol % based on the total amount of the uncolored magenta coupler present in the silver halide color photographic light-sensitive material is an uncolored 5-pyrazolone 2-equivalent magenta coupler.

4,894,319

COLOR IMAGE-FORMING PROCESS FOR HIGH SILVER CHLORIDE COLOR PHOTOGRAPHIC MATERIAL HAVING IMPROVED SPECTRAL SENSITIVITY AND SILVER REMOVABILITY

Tadashi Ikeda; Tadashi Ogawa, and Masaki Okazaki, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

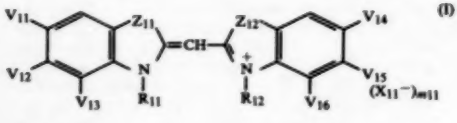
Division of Ser. No. 59,669, Jun. 8, 1987, Pat. No. 4,837,140. This application Nov. 16, 1988, Ser. No. 271,988

Claims priority, application Japan, Jun. 6, 1986, 61-131583

Int. Cl.[4] G03C 7/16

U.S. Cl. 430—383 **21 Claims**

1. A color image-forming process which comprises imagewise exposing a silver halide color photographic material, processing said photographic material with a color developer, then processing said photographic material with a solution having a pH of not more than about 6.5 and having a bleaching ability within about 75 seconds, said photographic material comprising a reflective support having thereon a blue-sensitive silver halide emulsion layer containing a yellow dye-forming coupler, a green-sensitive silver halide emulsion layer containing a magenta dye-forming coupler and a red-sensitive silver halide emulsion layer containing a cyan dye-forming coupler, the total silver amount of said silver halide on said reflective support being up to about 0.78 g/m^2, and at least one of said emulsion layers comprising a silver halide emulsion substantially excluding silver iodide and comprising about 80 mol % or more silver chloride and containing a spectral sensitizing dye represented by the following general formula (I), (II) or (III):



(I)

wherein:

Z_{11} represents an oxygen atom, a sulfur atom or a selenium atom;

Z_{12} represents a sulfur atom or a selenium atom;

R_{11} and R_{12}, which may be the same or different, each represents an optionally substituted alkyl group or alkenyl group containing up to 6 carbon atoms, with at least one of R_{11} and R_{12} being a sulfo-substituted alkyl group;

when Z_{11} represents an oxygen atom, V_{11} and C_{13} each represents a hydrogen atom, and V_{12} represents an optionally substituted phenyl group, or V_{11} and V_{12}, or V_{12} and V_{13}, may be linked to each other to form a fused benzene ring;

when Z_{11} represents a sulfur atom or a selenium atom, V_{11} represents an alkyl group containing up to 4 carbon atoms, an alkoxy group containing up to 4 carbon atoms or a hydrogen atom, V_{12} represents an alkyl group containing up to 5 carbon atoms, an alkoxy group containing up to 4 carbon atoms, a chlorine atom, a hydrogen atom, an optionally substituted phenyl group or a hydroxy group, and V_{13} represents a hydrogen atom, or V_{11} and V_{12}, or V_{12} and V_{13}, may be linked to each other to form a fused benzene ring;

when Z_{12} represents a selenium atom, V_{14}, V_{15}, and V_{16} are respectively the same as defined for V_{11}, V_{12}, and V_{13} in connection with the case where Z_{11} represents a selenium atom;

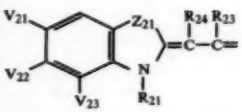
when Z_{12} represents a sulfur atom and Z_{11} represents a selenium atom, V_{14} represents a hydrogen atom, an alkoxy group containing up to 4 carbon atoms or an alkyl group containing up to 5 carbon atoms, V_{15} represents an alkoxy group containing up to 4 carbon atoms, an optionally substituted phenyl group, an alkyl group containing up to 4 carbon atoms, a chlorine atom or a hydroxy group, and V_{16} represents a hydrogen atom, or V_{14} and V_{15}, or V_{15} and V_{16}, m ay be linked to each other to form a fused benzene ring;

when Z_{11} and Z_{12} both represent a sulfur atom, V_{14} and V_{16} each represents a hydrogen atom, and V_{15} represents an optionally substituted phenyl group, or V_{14} and V_{15}, or V_{15} and V_{16}, may be linked to each other to form a ring;

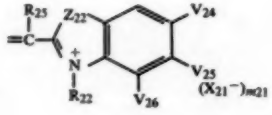
when Z_{11} represents an oxygen atom and z_{12} represents a sulfur atom, V_{14} and V_{16} each represents a hydrogen atom, and V_{15} represents a chlorine atom, an optionally substituted phenyl group or an alkoxy group containing up to 4 carbon atoms, or V_{15} and V_{16} may be linked to each other to form a fused benzene ring;

X_{11} represents a counter ion which is required to neutralize a charge on a cyanine dye of formula (I) or (II); and

m_{11} represents 0 or 1;



(II)



wherein:

Z_{21} represents an oxygen atom, a sulfur atom, a selenium atom, or

Z_{22} represents an oxygen atom or

R_{21} and R_{22} are the same as defined for R_{11} or R_{12} in general

formula (I), or R_{21} and R_{24}, or R_{22} and R_{25}, may be linked to each other to form a 5- or 6-membered carbon ring;

R_{23} represents a hydrogen atom when at least one of z_{21} and Z_{22} represents

or represents an ethyl group, a propyl group or a butyl group in other cases;

R_{26} and R_{27} are the same as defined for R_{11} in general formula (I), provided that R_{21} and R_{26}, and R_{22} and R_{27}, do not represent a sulfo group-containing substituent at the same time;

R_{24} and R_{25} each represents a hydrogen atom;

V_{21} represents a hydrogen atom when Z_{21} represents an oxygen atom, or represents a hydrogen atom, an alkyl group containing up to 5 carbon atoms or an alkoxy group containing up to 5 carbon atoms when Z_{21} represents a sulfur atom or a selenium atom, or represents a hydrogen atom or a chlorine atom when Z_{21} represents

V_{22} represents a hydrogen atom, an alkyl group containing up to 5 carbon atoms, an alkoxy group containing up to 5 carbon atoms, a chlorine atom or an optionally substituted phenyl group, or V_{22} may be bonded to V_{21} or V_{23} to form a fused benzene ring when Z_{21} represents an oxygen atom and Z_{22} represents

or V_{22} represents an optionally substituted phenyl group or may be bonded to V_{21} or V_{23} to form a fused benzene ring when Z_{21} and Z_{22} both represent an oxygen atom, or V_{22} represents a hydrogen atom, an alkyl group containing up to 5 carbon atoms, an alkoxycarbonyl group containing up to 5 carbon atoms, an alkoxy group containing up to 4 carbon atoms, an acylamino group containing up to 4 carbon atoms, a chlorine atom, or an optionally substituted phenyl group when Z_{21} represents a sulfur atom or a selenium atom, or may be bonded to V_{23} to form a fused benzene ring when Z_{21} represents a sulfur atom, or represents a chlorine atom, a trifluoromethyl group, a cyano group, an alkylsulfonyl group containing up to 4 carbon atoms or an alkoxycarbonyl group containing up to 5 carbon atoms when Z_{21} represents

V_{24} represents a hydrogen atom when Z_{22} represents an oxygen atom, or represents a hydrogen atom or a chlorine atom when Z_{22} represents

V_{25} represents an alkoxy group containing up to 4 carbon atoms, a chlorine atom or an optionally substituted phenyl group or may be bonded to V_{24} or V_{26} to form a fused benzene ring when Z_{22} represents an oxygen atom, or is bonded to V_{24} or V_{26} to form a fused benzene ring when Z_{21} represents

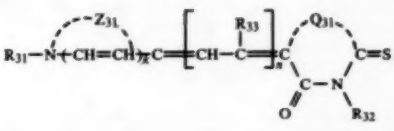
an oxygen atom, a sulfur atom or a selenium atom, or, when Z_{22} represents

V_{25} represents a chlorine atom, a trifluoromethyl group, a cyano group, an alkylsulfonyl group containing up to 4 carbon atoms or a carboxyalkyl group containing up to 5 carbon atoms;

V_{26} represents a hydrogen atom;

X_{21} represents a counter ion which is required to neutralize a charge on a cyanine dye of formula (I) or (II); and

m_{21} represents 0 or 1;



(III)

wherein:

Z_{31} represents atoms forming a heterocyclic nucleus of thiazoline, thiazole, benzothiazole, naphthothiazole, selenazoline, selenazole, benzoselenazole, naphthoselenazole, benzimidazole, naphthoimidazole, oxazole, benzoxazole, zole, selenazoline, selenazole, benzoselenazole, naphthoselenazole, benzimidazole, naphthoimidazole, oxazole, benzoxazole, naphthoxazole or pyridine, with the heterocyclic nucleus being optionally substituted;

when Z_{31} represents atoms forming a benzimidozole nucleus, one or more substituents in the fused benzene ring are selected from among a chloride atom, a cyano group, an alkoxycarbonyl group containing up to 5 carbon atoms, an alkylsulfonyl group containing up to 4 carbon atoms, and a trifluoromethyl group;

when Z_{31} represents atoms forming heterocyclic nuclei other than benzimidozole, thiazoline and selenazoline, one or more substituents in the fused benzene ring or naphthalene ring are selected from among an alkyl group containing up to 8 carbon atoms, a hydroxy group, an alkoxycarbonyl group containing up to 5 carbon atoms, a halogen atom, a carboxy group, a furyl group, a thienyl group, a pyridyl group, a phenyl group and a substituted phenyl group;

when Z_{31} represents atoms forming a selenazoline or thiazoline nucleus, one or more substituents in the nucleus is selected from among an alkyl group containing up to 6 carbon atoms, a hydroxyalkyl group containing up to 5

carbon atoms and an alkoxycarbonylalkyl group containing up to 5 carbon atoms;

R_{31} is the same as defined for R_{11} or R_{12} in general formula (I);

R_{32} is the same as defined for R_{11} or R_{12} in general formula (I) or represents a hydrogen atom, a furfuryl group or an optionally substituted aryl group, provided that at least one of R_{31} and R_{32} represents a substituent having a sulfo or carboxy group and the other represents a substituent having no sulfo group;

R_{33} represents a hydrogen atom, an alkyl group containing up to 5 carbon atoms, a phenethyl group, a phenyl group or a 2-carboxyphenyl group;

Q_{31} represents an oxygen atom, a sulfur atom, a selenium atom or

provided that, when Z_{31} represents atoms forming a thiazoline, selenazoline or oxazole nucleus, Q_{31} represents a sulfur atom, a selenium atom or

R_{34} represents a hydrogen atom, a pyridyl group, a phenyl group, a substituted phenyl group, or an aliphatic hydrocarbyl group optionally containing an oxygen atom, a sulfur atom or a nitrogen atom in the carbon chain, optionally having a substituent or substituents, and containing a total of up to 8 carbon atoms;

k represents 0 or 1; and

n represents 0 or 1 provided that, when n represents 1 and Z_{31} represents atoms forming a pyridine nucleus, Q_{31} represents an oxygen atom.

4,894,320

PHOTOGRAPHIC METHOD USING BLEACHING SOLUTION CONTAINING FERRIC COMPLEX SALTS AND AN AROMATIC COMPOUND

Shinji Ueda; Masakazu Morigaki, and Kozo Aoki, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

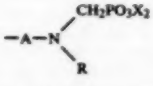
Filed Sep. 25, 1987, Ser. No. 101,319

Claims priority, application Japan, Sep. 25, 1986, 61-224905

Int. Cl.[4] G03C 7/42

U.S. Cl. 430—393 **9 Claims**

1. A method of processing an imagewise exposed silver halide color photographic material comprising developing the material with a color developing solution, and then processing the material with a solution having a bleaching ability, wherein said processing solution having a bleaching ability contains a ferric complex salt comprising an aminocarboxylic acid ferric salt, and, as a complexing agent, an aromatic compound having at least one group represented by the following general formula (I):



(I)

wherein X represents a hydrogen atom or an organic or inorganic cation, A represents a single bond or a divalent linking group, and R represents a hydrogen atom, and aliphatic group, an aromatic group, a heterocyclic group, an acyl group, a sulfonyl group, said A or $—CH_2PO_3X_2$ wherein X is as defined above, and wherein said aminopolycarboxylic acid ferric salt and said complexing agent are present in a molar ratio of from about 1/10 to about 10/1 and further provided that said ferric complex salt is present in said processing solution in an amount of from about 0.1 to about 1 mol per liter.

4,894,321

PHOTOGRAPHIC SUPPORT AND COLOR PHOTOSENSITIVE MATERIAL

Tadashi Ogawa, Minami-Ashigara; Tetsuro Fuchizawa, Fujinomiya; Masaru Sano, Minami-Ashigara; Seiichi Taguchi, Minami-Ashigara, and Keisuke Shiba, Minami-Ashigara, all of Japan, assignors to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan

Filed Jul. 15, 1987, Ser. No. 73,767

Claims priority, application Japan, Jul. 17, 1986, 61-168801; Jul. 17, 1986, 61-168803

Int. Cl.[4] G03C 1/87

U.S. Cl. 430—496 **19 Claims**

1. A photographic support comprising, on a substrate, a filling layer having a secondary diffuse-reflective surface, comprising a fine solid metal powder selected from the group of aluminum, silver, gold, nickel, magnesium, or alloys thereof, and a resin, wherein said filling layer has a reflectance of at least 0.5 and wherein said metal powder has an average particle diameter of from 0.01 to 100μ and is dispersed in the resin.

4,894,322

LIGHT-SENSITIVE SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL

Shigeto Hirabayashi; Syoji Matsuzaka; Yukio Ohya, and Yoshiyuki Nonaka, all of Hino, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Feb. 20, 1986, Ser. No. 831,993

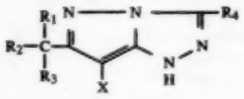
Claims priority, application Japan, Feb. 27, 1985, 60-36278

The portion of the term of this patent subsequent to Dec. 1, 2004, has been disclaimed.

Int. Cl.[4] G03C 7/38, 1/02

U.S. Cl. 430—505 **11 Claims**

1. A light-sensitive silver halide color photographic material having photographic constituent layers including a blue-sensitive silver halide emulsion layer, a green-sensitive silver halide emulsion layer and a red-sensitive silver halide emulsion layer on a support, wherein the content of silver bromide of the silver halides in said green-sensitive silver halide emulsion layer and red-sensitive silver halide emulsion layer is 5 to 65 mole %, and said green-sensitive silver halide emulsion layer contains at least one of the compounds represented by the formula [I] shown below:



wherein X represents a halogen atom or a monovalent organic group eliminable through coupling reaction with an oxidized product of a developing agent; R_1 to R_3, which may be either identical or different, each represent a hydrogen atom, a halogen atom, an alkyl group, a cycloalkyl group, an alkenyl group, a cycloalkenyl group, an alkynyl group, an aryl group, a heterocyclic group, an acyl group, a sulfonyl group, a sulfinyl group, a phosphonyl group, a carbamoyl group, a sulfamoyl group, a cyano group, a spiro compound residue, a bridged hydrocarbon compound residue, an alkoxy group, an aryloxy group, a heterocycloxy group, a siloxy group, an acyloxy group, a carbamoyloxy group, an amino group, an acylamino group, a sulfonamide group, an imide group, a ureido group, a sulfamoylamino group, an alkoxycarbonylamino group, an aryloxycarbonylamino group, an alk-

oxycarbonyl group, an aryloxycarbonyl group, an alkylthio group, an arylthio group or a heterocyclic thio group, with proviso that at least two of R_1 to R_3 are not hydrogen atoms; R_4 represents a hydrogen atom, an alkyl group, an aryl group, a heterocyclic group, an acylamino group, an alkylamino group, an anilino group, an alkoxycarbonyl group or an alkylthio group.

4,894,323

SILVER HALIDE PHOTOGRAPHIC MATERIAL COMPRISING A POLYOXYETHYLENIC COMPOUND AND A SENSITIZING DYE

Kiyoshi Kawai, and Mikio Ihama, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Ashigara, Japan

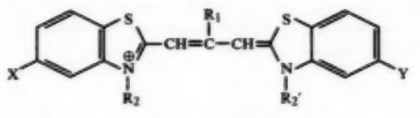
Filed May 26, 1987, Ser. No. 53,673

Claims priority, application Japan, May 27, 1986, 61-121781

Int. Cl.[4] G03C 1/19, 1/28

U.S. Cl. 430—569 **11 Claims**

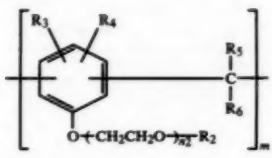
1. A silver halide photographic material which comprises a support having provided thereon at least one silver halide emulsion layer containing a silver halide emulsion and which contains at least one polyoxyethylenic compound in said emsulion layer or at least one other hydrophilic colloid layer, wherein silver halide grains contained in the silver halide emulsion are chemically sensitized in the presence of a water-soluble spectral sensitizing dye having a solubility in 20° C. water of 0.2 g/100 ml H_2O or more, or said water-soluble sensitizing dye is added to the silver halide emulsion after chemical sensitization and before coating, wherein said sensitizing dye is a cyanine dye having the formula:



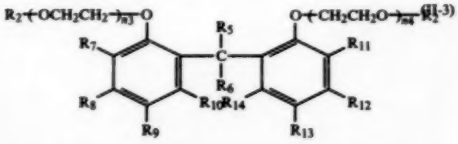
(I)

where R_1 represents an alkyl group; R_2 and R_2' are the same or different and represent a carboxyalkyl group or a sulfoalkyl group; and X and Y are the same or different and represent a hydrogen atom, and alkoxyl group, a carboxyalkyl group, an acetylamino group, an alkyl group or a hydroxy group, and wherein the polyoxyethylenic compound is selected from surface active agents represented by the general formulae (II-1), (II-2) and (II-3):

(II-1)



(II-2)



(II-3)

wherein R_1 represents a hydrogen atom, or a substituted or unsubstituted alkyl, alkenyl or aryl group having 1 to 30 carbon atoms, A represents an —O— group, an —S— group, a —COO— group, an —N—R_{15} group, a —CO—N—R_{15} group, or an —SO_2N—R_{15} group in which R_{15} represents a hydrogen atom, or a substituted or unsubstituted alkyl group, R_2 has the same meaning as R_1 or R_1-A, R_3, R_4, R_8, R_{10}, R_{12} and R_{14} each presents a hydrogen atom, a substituted or unsubstituted alkyl, aryl or alkoxy group, a halogen atom, an acyl group, an amido group, a sulfonamido group, a carbamoyl group, or a sulfamoyl group, R_7, R_9, R_{11} and R_{13} each represent a substituted or unsubstituted alkyl, aryl or alkoxy group, a halogen atom, an acryl group, an amido group, a sulfonamido group, a carbamoyl group, or a sulfamoyl group, R_5 and R_6 each represent a hydrogen atom, or a substituted or unsubstituted alkyl, aryl or heterocyclic aromatic ring, n_1, n_2, n_3 and n_4 each represent an average polymerization degree of oxidized ethylene ranging from 2 to 100, and m represents an average polymerization degree of 5 to 50, with the proviso that R_5 and R_6, R_7 and R_8, R_9 and R_{10}, R_{11} and R_{12}, and R_{13} and R_{14} each may be connected to each other to form a substituted or unsubstituted ring.

11. A silver halide photographic material as claimed in claim 1, wherein silver halide grains contained in the silver halide emulsion are chemically sensitized in the presence of a water-soluble sensitizing dye having a solubility in 20° C. water of 0.2 g/100 ml H_2O or more, or said water-soluble sensitizing dye is added to the silver halide emulsion after chemical sensitization and before cooling to coagulate.

4,894,324

HARDENERS FOR PROTEINS, A LAYER OF BINDER HARDENED THEREWITH AND A PHOTOGRAPHIC RECORDING MATERIAL CONTAINING SUCH A LAYER

Wolfgang Himmelmann; Johannes Sobel, both of Leverkusen; Hans Ohlschläger, Bergisch Gladbach, and Karl-Wilhem Schranz, Odenthal-Hahnenberg, all of Fed. Rep. of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

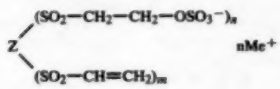
Filed Mar. 3, 1988, Ser. No. 163,738

Claims priority, application Fed. Rep. of Germany, Mar. 17, 1987, 3708541

Int. Cl.[4] G03C 1/30

U.S. Cl. 430—622 **5 Claims**

1. Hardened binder layers in which the binder contains a protein, characterized in that they are hardened with a water soluble sulphate corresponding to the following formula



wherein

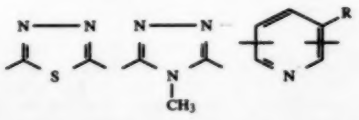
Me denotes a metal cation,

n represents an integer >0,

m represents an integer ≥ 0,

M+n represents 2 and

Z corresponds to one of the following formulae:



wherein R denotes C_1–C_4 alkyl, phenyl or C_1–C_4 alkoxy.

4,894,325

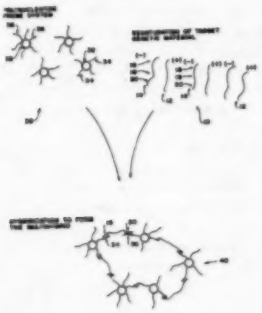
HYBRIDIZATION METHOD FOR THE DETECTION OF GENETIC MATERIAL

Dean L. Engelhardt, and Elazar Rabbani, both of New York, N.Y., assignors to Enzo Biochem, Inc., New York, N.Y.

Continuation of Ser. No. 653,816, Sep. 24, 1984, abandoned, which is a continuation-in-part of Ser. No. 605,022, Apr. 27, 1984, abandoned. This application Jan. 15, 1987, Ser. No. 5,327

Int. Cl.[4] C12Q *1/68;* G01N *33/552, 33/546*

U.S. Cl. 435—6 15 Claims



1. A method for the detection of single-stranded target genetic material comprising the steps of:

(a) contacting, under conditions permissive of hybridization, said target genetic material with

(i) a first polynucleotide probe comprising a first partic to which is attached a plurality of first single-stranded polynucleotide segments complementary to a first portion of said target genetic material, and

(ii) a second polynucleotide probe comprising a second particle having attached thereto a plurality of second single-stranded polynucleotide segments complementary to a second portion of said target genetic material;

(b) permitting hybridization of said first polynucleotide segments to said first portion of target genetic material and said second segments to said second portion of target genetic material, said hybridizations resulting in agglutination; and

(c) detecting said agglutination.

4,894,326

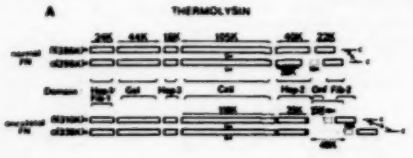
MONOCLONAL ANTIBODY DEFINING ONCOFETAL STRUCTURE OF FIBRONECTIN

Hidemitsu Matsuura, and Sen-itiroh Hakomori, both of Mercer Island, Wash., assignors to Fred Hutchinson Cancer Research Center, Seattle, Wash.

Filed Apr. 9, 1986, Ser. No. 849,694

Int. Cl.[4] C07K *15/14;* G01N *33/574, 33/577*

U.S. Cl. 435—7 16 Claims



1. An immunological binding partner defined by specifically binding with the COOH-terminal region released by cathepsin D digestion of oncofetal fibronectin but not with either normal adult fibronectin or the Hep-2 or Fib-2 fragments released by thermolysin digestion of oncofetal fibronectin.

4,894,327

ANTI-HUMAN MESOTHELIAL CELL MONOCLONAL ANTIBODY

Hajime Yoshida, Sagamihara, Japan, and Nobuo Hanai, Mercer Island, Wash., assignors to Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan

Filed Oct. 26, 1987, Ser. No. 112,149

Claims priority, application Japan, Oct. 28, 1986, 61-256142

Int. Cl.[4] G01N *33/577, 33/574;* C12N *5/00, 15/00*

U.S. Cl. 435—7 3 Claims

1. An anti-human mesothelial cell monoclonal antibody, which is produced from hybridoma cell line KM-277, ECACC No. 86102303, belongs to the class IgG and reacts with human mesothelial cell but not with other normal human cells and human tumor cells.

4,894,328

IMMUNODIAGNOSTIC TEST FOR SYPHILIS AND OTHER TREPONEMAL INFECTIONS

John F. Alderete, and Joel B. Baseman, both of San Antonio, Tex., assignors to Board of Regents, The University of Texas System, Austin, Tex.

Continuation of Ser. No. 844,340, Mar. 26, 1986, abandoned, which is a continuation of Ser. No. 498,751, May 27, 1983, abandoned. This application May 4, 1987, Ser. No. 46,277

Int. Cl.[4] G01N *33/53, 33/552, 33/544;* C07K *15/14*

U.S. Cl. 435—7 11 Claims

6. An immunoassay for the detection of anti-*Treponema pallidum* antibody present in a biological sample, the method comprising:

(a) providing insolubilized fibronectin having bound thereto antigenic outer membrane proteins extracted from *Treponema pallidum* so as to form an insolubilized fibronectin, treponemal protein product;

(b) contacting and incubating the insolubilized fibronectin, treponemal protein product for a sufficient time and with a sufficient quantity of the biological sample to permit binding reactions to occur between said insolubilized fibronectin, treponemal protein product and said biological sample; and

(c) determining the presence of anti-*Treponema pallidum* antibody bound to the insolubilized fibronectin, treponemal protein product by contacting the insolubilized fibronectin, treponemal protein product with a quantity of indicator antibody sufficient for binding with the anti-*Treponema pallidum* antibody.

4,894,329

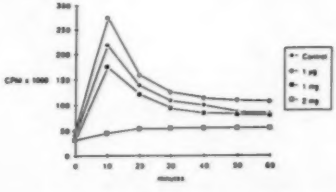
METHOD OF ASSAYING THE BIOACTIVITY OF A THYMIC EXTRACT

Linda Harrington-Fowler, Medfield, and Martin S. Wilder, Amherst, both of Mass., assignors to Serono Pharmaceutical Partners, Boston, Mass.

Filed Feb. 27, 1987, Ser. No. 19,681

Int. Cl.[4] C12Q *1/02*

U.S. Cl. 435—29 4 Claims



1. A method of assaying the bioactivity of a thymic extract which comprises:

(a) incubating macrophages derived from the HRS/J mouse with said extract,
(b) incubating the product of (a) with a phagocytic stimulator,
(c) adding a luminescent detecting solution to the product of (b),
(d) measuring the chemiluminescence response of the product of (c), and
(e) comparing the results obtained in (e) to those obtained using a control extract of known activity.

4,894,330

PURIFICATION OF RECOMBINANT BETA-INTERFERON INCORPORATING RF-HPLC

Susan Hershenson, San Francisco, and Ze'ev Shaked, Berkeley, both of Calif., assignors to Cetus Corporation, Emeryville, Calif.

Filed Dec. 23, 1986, Ser. No. 946,083
Int. Cl.[4] C12P *21/00*; A61K *45/02*; C07K *15/26*
U.S. Cl. 435—69.51 **34 Claims**

1. A method for purifying recombinant interferon-β (IFN-β) which comprises isolating the IFN-β from hosts transformed to produce it and passing the isolated IFN-β through at least one bonded phase, wide pore, silica gel, reverse-phase high performance liquid chromatography column using a solvent system comprising an organic modifier comprising from about 50% to 100% acetonitrile and an organic acid selected from the group consisting of heptafluorobutyric acid (HFBA) and trifluoroacetic acid (TFA).

4,894,331

PARTIAL MARKER CASSETTE MUTAGENESIS OF XYLOSE ISOMERASE

Barry J. Ratzkin, and Carlos A. Fisher, both of Thousand Oaks, Calif., assignors to Amgen Inc., Thousand Oaks, Calif.

Filed Sep. 27, 1985, Ser. No. 781,220
Int. Cl.[4] C12P *21/00, 19/24*; C12N *15/00, 9/92*
U.S. Cl. 435—94 **16 Claims**

1. A structural gene which, when inserted in an appropriate vector used to transform an appropriate host, is capable of expressing an enzyme which isomerizes glucose to fructose and which is characterized by the presence of an adenosine residue at position 784 of the nucleotide sequence as given in [Table I] FIG. 7 and is also characterized as having a nucleotide sequence sufficiently similar to the nucleotide sequence of [Table I] FIG. 7 to permit said enzyme to isomerize glucose to fructose.

4,894,332

DNA SEQUENCES CODING FOR *MYCOPLASMA HYPOPNEUMONIAE* SURFACE ANTIGENS, METHODS OF USE TO MAKE THE CORRESPONDING PROTEINS

Heinz E. Schaller, and Mo-Quen Klinkert, both of Heidelberg, Fed. Rep. of Germany, assignors to Biogen, Inc., Cambridge, Mass.

Filed Mar. 27, 1985, Ser. No. 716,564
Int. Cl.[4] C12P *21/00, 21/02*; C12N *15/00, 7/00*
U.S. Cl. 435—69.3 **11 Claims**

1. A DNA sequence selected from the group consisting of

GAACAACAACAATGAAAAAAAGAAATAATGCGT-
GATTTTTTTGAAAKGGGAAG
AAAAGGCCTTTTTTTATTACCAGT-
TATATGGCCCTCTTTTC;

AAATAATCCTGAATCAAAATCGCAAGATAATG-
CAAATAAAGGAAATTATCTT
TCTTTAAATATTGGTTATCGTAGTTTTGCT-
GATAAACCTGACTTGCTGATGG TTTTAT-
TACAGTCCCAAAAGTTGGTAAAGAACTTAG-
TAAATCGACAATTATG GCTGATCCTGTC-
CCATAAAAAACAGGTAAAAAAAGTCATC-
GAAAACGGG CAAAAAATAG-
CAAAAGACCTTGGTGAA;

GAATTCAAAGATGAGTTTAAAAAATACTGAACC-
TAATTTTTTTGTCGGCATC TATGAAAAGG-
CAATTGATAAACGTTTTTCTTT-
GATAGATAAAATTAAAATCG;

GAATTCGACCGTAAGTGAAACACGTGATTTTATT-
CAAAAATTTGACATTTTC TATCAG-
GAAAATGTGGGCAAAATCAAAGAAGATT-
TAGATTTTGCAATAGCTC CAAGTTTTATATCTT-
TATCACTAATTICTAAGTCCTTGACTAAAAAAT-
TAGA AATTGCTGCTCAAAATCTTAGTCAGTTT-
GATTCAGGAGCCTTTACTGGGGAA ATCAGTG-
GCAAAATGCTGCAGGATTTAGG-
GACAAAATATGTAATT; and

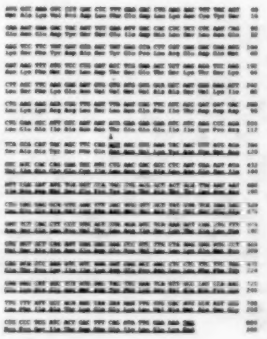
GAATTCTGGACCTGTATATGGGCCATTTT-
TACCGGGCGAAGATAAGCGCGAA CTCAACC-
CAATTGTGGCAAAAAGTGCTAATTCAAT-
CACAATTGATCTTAATA TTTTATCGATAATAAC-
CAAAACAAAATTATCAGAGAGAGTTGCAGCCT-
TAAG CAGAGTTGAATTC.

4,894,333

BOVINE INTERLEUKIN-1α

Douglas P. Cerretti; Charles R. Maliszewski, and Michael A. Schoenborn, all of Seattle, Wash., assignors to Immunex Corporation, Seattle, Wash.

Filed May 28, 1987, Ser. No. 55,108
Int. Cl.[4] C12N *1/18, 1/00, 15/00, 1/22*; C12P *21/00, 21/02*; C07H *15/12*; C07K *13/00*
U.S. Cl. 435—69.52 **13 Claims**



1. An isolated DNA sequence encoding bovine interleukin-1α (bIL-1α).

4,894,334

METHOD OF IMPROVING THE YIELD OF HETEROLOGOUS PROTEIN PRODUCED BY CULTIVATING RECOMBINANT BACTERIA

Arie Ben-Bassat, Walnut Creek; Glenn Doria, San Rafael, and Keith Bauer, Oakland, all of Calif., assignors to Cetus Corporation, Emeryville, Calif.

Continuation-in-part of Ser. No. 594,250, Mar. 28, 1984, Pat. No. 4,656,132. This application Apr. 6, 1987, Ser. No. 35,069
The portion of the term of this patent subsequent to Apr. 7, 2004, has been disclaimed.
Int. Cl.[4] C12P *21/00*; C12N *15/00, 1/38, 1/20*
U.S. Cl. 435—69.1 **9 Claims**

1. A method for improving heterologous protein yield from a recombinant *E. coli*, the method comprises:
inoculating a liquid nutrient medium with the *E. coli* and cultivating the *E. coli* at conditions which favor growth; and
adding a composition to the *E. coli* culture when the cul-

ture's cellular density is at least 2 OD units when measured at 680 nm, the composition supports bacterial growth during the terminal portion of the cultivation and is absent from the liquid nutrient medium prior to the addition;

the composition comprises: from 0.5 to 5.0 v/v % ethanol; or from 0.5 to 5.0 w/v % of a protein hydrolysate or a mixture of amino acids; or mixtures thereof.

4,894,335

OIL-IN-WATER EMULSIONS CONTAINING HETEROPOLYSACCHARIDE BIOPOLYMERS

Michel Peignier, Versailles; Michel Garcia, Antony; Alain Senechal, Maisons-Alfort; Pierre Gagne, Tassin-la-Demi Lune; Dominique Lespinasse, Jassans Riottier, and Jean-Bernard Chaux, Tassin-la-Demi-Lune, all of France, assignors to Rhone-Poulenc Specialites Chimiques, Courbevoie, France

Continuation of Ser. No. 627,674, Jul. 5, 1984, abandoned. This application Mar. 16, 1987, Ser. No. 26,188

Claims priority, application Japan, Jul. 4, 1983, 58-11060

Int. Cl.[4] C12P *19/06;* **E21B** *43/16;* **C09K** *3/00;* **C10G** *32/00*

U.S. Cl. 435—104 **16 Claims**

1. An oil-in-water emulsion which comprises (i) 40 to 99 parts by weight of an aqueous phase comprising from 10 to 60% by weight of a heteropolysaccharide biopolymer and from 40 to 90% by weight of water, (ii) 1 to 60 parts by weight of oil, and (ii) 1 to 40% by weight, with respect to the combined weight of the components (i) plus (ii), of at least one surface active agent, the oil-in-water emulsion containing greater than 15 up to 60% by weight of the heteropolysaccharide biopolymer.

4,894,336

RACEMIC DISSOCIATION OF 3-ACYLOXY BICYCLO(3.3.0)OCTAN-7-ONE-2-CARBOXYLIC ACID ESTERS BY STEREOSPECIFIC ENZYMATIC OR MICROBIOLOGICAL ACYLATE HYDROLYSIS

Karl Petzoldt; Helmut Duhl, and Werner Skuballa, all of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

PCT No. PCT/DE87/00513, § 371 Date Jul. 13, 1988, § 102(e) Date Jul. 13, 1988, PCT Pub. No. WO88/03567, PCT Pub. Date May 19, 1988

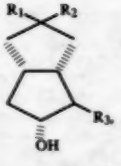
PCT Filed Nov. 12, 1987, Ser. No. 237,109

Claims priority, application Fed. Rep. of Germany, Nov. 13, 1986, 3638758

Int. Cl.[4] C12P *41/00, 17/02, 7/42;* **C07C** *177/00*

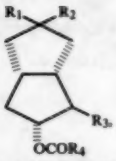
U.S. Cl. 435—146 **10 Claims**

1. Process for the production of optically active (+)-bicyclo[3.3.0]octanol of formula (+)- I,



(+)-I

in which R_1 and R_2 together mean an oxygen atom or the double-bond radical —O—X—O— with X as straight-chain or branched-chain alkylene with 1-7 C atoms or R_1 and R_2 mean in each case the radical OR_5 with R_5 as straight-chain or branched-chain alkyl with 1-7 atoms and R_3 means the radical COOZ with Z as hydrogen atom, straight-chain or branched-chain alkyl with 1-7 C atoms, cycloalkyl with 3-6 C atoms, phenyl or aralkyl with 7-10 C atoms or R_3 means the radical $-(CH_2)_n-O-COR_4$ with n meaning 1-4 and R_4 as straight-chain or branched-chain alkyl with 1-7 C atoms, cycloalkyl with 3-6 C atoms, phenyl or aralkyl with 7-10 C atoms, characterized in that racemic 3alpha-acyloxy-cis- bicyclo[3.3.0]octane derivatives of the formula (±)-II,



(±)-II

in which R_1, R_2, R_3 and R_4 have the above-indicated meanings, are enzymatically or microbiologically subjected to a stereospecific acylate hydrolysis and the resulting (+)-bicyclo[3.3.0]octanol derivative (+)-I is separated from the unsaponified bicyclo[3.3.0]octanol acylate of formula (−)-II or the unsaponified enantiomer (+)-II is separated from the saponified bicyclo[3.3.0]octanol derivative (−)-I and then subjected to a chemical acylate hydrolysis.

4,894,337

PROCESS FOR THE BIOPRODUCTION OF CYCLIC HYDROXIDES

Patrick J. Oriel, Midland, and Gopalakrishnan Gurujeyalakshmi, East Lansing, both of Mich., assignors to Board of Trustees operating Michigan State University, East Lansing, Mich.

Filed Jan. 17, 1989, Ser. No. 297,041

Int. Cl.[4] C12P *7/22, 7/02/1/04;* **C12R** *1/07*

U.S. Cl. 435—156 **18 Claims**

1. A process for producing a cyclic hydroxide from a compound having a benzene ring which comprises:

(a) providing a *Bacillus stearothermophilus* which metabolizes phenol in a growth medium containing between about 5 mM and 20 mM of phenol with the compound having the benzene ring and an effective amount of tetracycline which inhibits degradation of the cyclic hydroxide by the *Bacillus stearothermophilus*; and

(b) modifying the compound having the benzene ring with the Bacillus to produce the cyclic hydroxide.

4,894,338

YEAST STRAINS PRODUCING CELLULOLYTIC ENZYMES AND METHODS AND MEANS FOR CONSTRUCTING THEM

Jonathan Knowles; Merja Penttilä; Tuula Teeri, all of Helsinki; Helena Nevalainen, Vaajakoski; Irma Salovuori, Järvenpää, and Päivi Lehtovaara-Helenius, Helsinki, all of Finland, assignors to Oy Alko AB, Helsinki, Finland

PCT No. PCT/FI85/00039, § 371 Date Jan. 30, 1986, § 102(e) Date Jan. 30, 1986, PCT Pub. No. WO85/04672, PCT Pub. Date Oct. 24, 1985

PCT Filed Apr. 12, 1985, Ser. No. 817,942

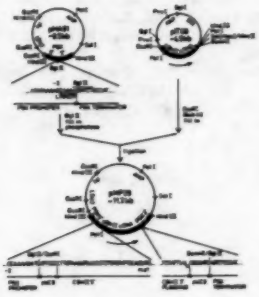
Claims priority, application Finland, Apr. 13, 1984, 841500

Int. Cl.[4] C12N *15/00, 9/42, 1/16;* **C07H** *21/00*

U.S. Cl. 435—172.3 **13 Claims**

1. A substantially pure DNA sequence or its single or multi-

ple base substitutions, deletions, insertions or inversions, encoding an amino acid sequence comprising the mature cellobi-



ohydrolase II protein amino acid sequence shown in FIG. 5, or a portion thereof having cellobiohydrolase II activity.

4,894,339

IMMOBILIZED ENZYME MEMBRANE FOR A SEMICONDUCTOR SENSOR

Yoshio Hanazato; Satoru Shiono; Mamiko Nakako, and Satoshi Yamada, all of Hou, Japan, assignors to Seitaikinouriyou Kagakuhin Sinseizogijutsu Kenkyu Kumiai, Japan

Filed Dec. 17, 1986, Ser. No. 942,797

Claims priority, application Japan, Dec. 18, 1985, 60-283056; Jan. 27, 1986, 61-13900; Jan. 27, 1986, 61-13902

Int. Cl.[4] C12N *11/04, 11/08*; C12M *1/40*; G01N *27/26*

U.S. Cl. 435—182 **56 Claims**

1. A membrane containing an immobilized enzyme comprising:

a water soluble photosensitive resin including poly-vinyl pyrrolidone having a high molecular weight crosslinked to 2, 5-bis (4'-azide2'-sulfobenzal) cyclopentanone sodium salt; and an enzyme.

4,894,340

MICROBIAL SULFHYDRYL OXIDASE AND METHOD

Frank E. Hammer; Don Scott, both of Schaumburg, Ill.; Fred W. Wagner, Lincoln, Nebr.; Lee Ray, Elk Grove Village, Ill., and Rebecca S. de la Motte, Lincoln, Nebr., assignors to Suomen Sokeri Oy, Helsinki, Finland

Filed Dec. 21, 1987, Ser. No. 136,723

Int. Cl.[4] C12N *9/02*

U.S. Cl. 435—189 **14 Claims**

1. An isolated microbial sulfhydryl oxidase which is a flavoprotein and is characterized by a pH optimum of about 5.5 for the oxidation of glutathione in an acetate buffer at 25 degrees Centigrade, absorbance maxima at about 442.5 nanometers, 364.5 nanometers and 274 nanometers, and a molecular weight of about 106,000 as determined by equilibrium sedimentation; said sulfhydryl oxidase being constituted by subunits with a molecular weight of about 50,000 to about 55,000 as determined by SDS polyacrylamide gel eletrophoresis.

4,894,341

PRODUCTION OF CYANIDE HYDRATASE

Kenneth R. Richardson, Middlesbrough, England, assignor to Imperial Chemical Industries PLC, London, England

Filed Feb. 3, 1987, Ser. No. 10,489

Claims priority, application United Kingdom, Feb. 19, 1986, 8604069; Mar. 26, 1986, 8607595

Int. Cl.[4] C12N *9/78, 9/88*; C12P *13/02*; C12R *1/77*

U.S. Cl. 435—227 **11 Claims**

1. A process for the production of fungal cells containing the enzyme cyanide hydratase which comprises aerobically cultivating cells of a fungal strain selected from the group consisting of *Fusarium lateritium* Nees CMI 300533 and variants and mutants derived therefrom in an aqueous culture containing sources of carbon, appropriate inorganic nutrients and cyanide sufficient to induce production of the enzyme, and recovering fungal cells containing cyanide hydratase from the culture.

4,894,342

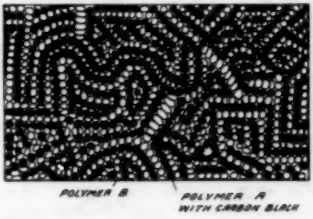
BIOREACTOR SYSTEM

Perry W. Guinn, Oregon City, and Gary N. Mills, Gladstone, both of Oreg., assignors to C. D. Medical, Inc., Miami Lakes, Fla.

Continuation-in-part of Ser. No. 862,014, May 12, 1986. This application Sep. 22, 1986, Ser. No. 909,962

Int. Cl.[4] C12M *1/04, 1/14, 1/34*

U.S. Cl. 435—291 **6 Claims**



1. A bioreactor system comprising:

nutrient fluid reservoir means for containing nutrient fluid;

bioreactor means for culturing biological materials;

fluid inlet means for connection to a source of fresh nutrient fluid;

fluid outlet means for connection to a used nutrient fluid drain;

first pump means operatively coupled to the nutrient fluid reservoir means and the bioreactor means for causing nutrient fluid to recirculate from the nutrient fluid reservoir means through the bioreactor means and back into the nutrient fluid reservoir means;

reversible second peristaltic pump means operatively coupled to the nutrient fluid means and being operable in first and second directions and having first and second tubes, the first tube coupling the fluid inlet means to a fresh fluid input circuit of the bioreactor system and the second tube coupling the fluid outlet means to a used fluid output circuit of the bioreactor means; and

check valve means connected to the first and second tubes of the second pump means for:

allowing the second pump means to pump fresh fluid from the fluid inlet means to the fresh fluid input circuit when operated in the first direction, but not pump fluid from the fluid outlet means to the used fluid output circuit when operated in said first direction; and

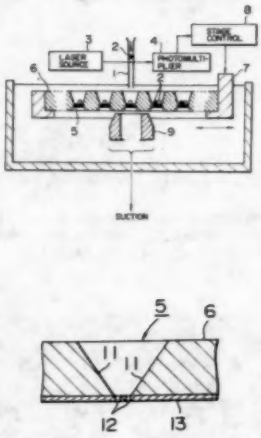
allowing the second pump means to pump used fluid from the used fluid output circuit to the fluid outlet means when operated in the second direction, but not pump fluid from the fresh fluid input circuit to the fluid inlet means when operated in said second direction.

4,894,343

CHAMBER PLATE FOR USE IN CELL FUSION AND A PROCESS FOR PRODUCTION THEREOF

Shinji Tanaka, Akishima; Kazuo Sato, Tokyo; Tsuneo Terasawa, Hachioji; Yoshio Kawamura, Kokubunji, and Hisashi Tsuruoka, Hachioji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 18, 1987, Ser. No. 122,269
Claims priority, application Japan, Nov. 19, 1986, 61-274031
Int. Cl.[4] C12M *1/20*
U.S. Cl. 435—301 5 Claims



1. A chamber plate for use in the fusion of biological cells comprising a plate of single crystal silicon in which a plurality of chambers for holding at least a pair of unit cells is formed in an array, each of said chambers having side and bottom walls for isolating the cells and for defining a base area keeping the cells in contact with each other, the bottom wall having a slit which allows passage of the cells.

4,894,344

METHOD FOR MANUFACTURING 2-AMINO-2-DEOXY-D-MANNITOL

Makoto Sugiyama, Kyoto; Yoji Ezure, Otsu; Nobutoshi Ojima, Moriyama; Kiyotaka Konno; Takashi Seto, both of Kyoto; Teruya Nakamura, Kusatsu, and Manabu Itoh, Otsu, all of Japan, assignors to Nippon Shinyaku Co., Ltd., Japan

Filed Nov. 28, 1988, Ser. No. 276,785
Claims priority, application Japan, Nov. 28, 1987, 62/300600
Int. Cl.[4] C12R *1/56, 1/465;* G09B *11/08, 27/08*
U.S. Cl. 435—899 9 Claims

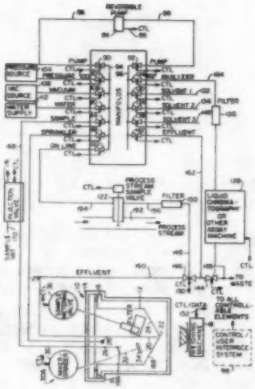
1. A process for the production of 2-amino-2-deoxy-D-mannitol which comprises culturing a 2-amino-2-deoxy-D-mannitol producing strain of the genus Streptomyces in a medium suitable for culturing Actinomycetes, isolating the 2-amino-2-deoxy-D-mannitol from the culture medium and recovering the isolated 2-amino-2-deoxy-D-mannitol.

4,894,345

PROCESS FOR PREPARATION OF SAMPLES FOR ANALYSIS

Andre Metzger, Le Verger, France; Peter Grimm, Frenkendorf, Switzerland; Andre J. Nohl, Menlo Park, and Vance J. Nau, Cupertino, both of Calif., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 942,353, Dec. 16, 1986. This application Oct. 14, 1987, Ser. No. 89,857
Int. Cl.[4] G01N *1/28*
U.S. Cl. 436—43 1 Claim



1. A process for preparing a solid sample for chemical assay by an assay system comprising the steps of:

(a) placing a known amount of a solid sample into a sample preparation chamber having a grinding and stirring mechanism therein and using a programmable electronic control system which possesses data regarding the quantity of said known amount of sample which has been placed into said sample preparation chamber to perform steps (b) through (m) automatically;

(b) grinding the known amount of sample in the sample preparation chamber until it is in pieces small enough to be efficiently dissolved in a solvent;

(c) placing a known quantity of a solvent in the sample preparation chamber;

(d) mixing said known amount of a sample with said known quantity of solvent in the sample preparation chamber, thereby creating a homogeneous mixture;

(e) withdrawing a known volume of said homogenized mixture from the sample preparation chamber into a sample metering valve;

(f) pressurizing said withdrawn volume of said homogenized mixture in said sample metering valve to compress any gas bubbles in said withdrawn volume of said homogenized sample, thereby generating a pressurized, homogenized mixture;

(g) isolating a known volume of said pressurized, homogenized mixture in said sample metering valve to obtain a non-isolated volume of said homogenized mixture in the sample preparation chamber and an isolated known volume of said pressurized, homogenized mixture which is isolated from the sample preparation chamber;

(h) flushing said non-isolated volume of homogenized mixture from the sample preparation chamber to waste;

(i) releasing the isolated known volume of said pressurized homogenized mixture back into the sample preparation chamber;

(j) if a predetermined sample concentration has been reached, continuing on to step (k), but if the predetermined sample concentration has not been reached, repeat-

ing steps (c)–(i) until the predetermined sample concentration has been reached and then continuing on to step (k);
(k) pumping a predetermined volume of the released, homogenized mixture to said assay device
(l) flushing any released, homogenized mixture remaining in the sample preparation chamber to waste; and (m) washing down said sample preparation chamber with a solvent and flushing the solvent to waste to thereby prepare said sample preparation chamber to process another sample.

4,894,346

METHOD FOR THE COLORIMETRIC DETERMINATION OF POLYCARBOXYLATES IN AQUEOUS SYSTEMS

Ronald R. Myers, Coraopolis, and Jack E. Fink, Darlington, both of Pa., assignors to Calgon Corporation, Pittsburgh, Pa.

Filed Oct. 11, 1983, Ser. No. 540,330
Int. Cl.[4] G01N *21/78, 33/44*
U.S. Cl. 436—85 **10 Claims**

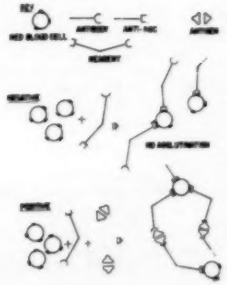
1. A method for determining the concentration of polycarboxylate compounds, added as scale or corrosion inhibitors, in an aqueous solution, consisting essentially of:
(a) adjusting the pH of a portion of said aqueous solution containing polycarboxylate compounds to a pH between 3.0 and 12.0;
(b) adding an effective amount of an aqueous solution of a metachromatic dye to the pH-adjusted portion of Step (a), wherein an effective amount refers to an amount of said dye solution which will, when added to the portion of Step (a), result in a dye to polycarboxylate group mole ratio between 0.1 and 100.0 in the admixture, thereby causing a shift in said dye's wavelength of maximum absorbance for that portion of said dye which aligns with anionic charges of said polycarboxylate compounds;
(c) measuring the absorbance of the admixture resulting from Step (b) at said shifted wavelength of maximum absorbance;
(d) comparing the absorbance from Step (c) with absorbances of standard samples containing known concentratons of polycarboxylic compounds and said effective amount of the dye solution of Step (b), thereby determining the polycarboxylate concentration of the portion of Step (a).

4,894,347

ERYTHROCYTE AGGLUTINATION ASSAY

Carmel J. Hillyard, Brisbane; Dennis B. Rylatt, Rosalie; Bruce E. Kemp, Kew, and Peter G. Bundesen, Fig Tree Pocket, all of Australia, assignors to Agen Limited, Australia

Continuation-in-part of Ser. No. 111,313, Oct. 22, 1989. This application Jan. 13, 1988, Ser. No. 143,343
Claims priority, application Australia, Sep. 17, 1987, P14400
Int. Cl.[4] G01N *33/541*
U.S. Cl. 436—540 **5 Claims**



1. A direct agglutination assay for the presence of an analyte in a whole blood sample from a subject which comprises contacting a blood sample containing erythrocytes endogenous to the subject with an agglutination reagent which comprises a conjugate of (a) an intact multivalent monoclonal antibody which binds to erythrocyte membranes or a multivalent binding fragment thereof, and (b) an analyte binding molecule, said conjugate being essentially incapable of agglutinating said erythrocytes in the absence of analyte, observing whether the erythrocytes are agglutinated and directly correlating the agglutination with the amount of analyte present; said assay being further characterized in that at no time are the sample or the conjugate with erythrocytes exogenous to the subject.

4,894,348

FLUORESCEIN-CONJUGATED PROTEINS WITH ENHANCED FLUORESCENCE

Ronald Robert C., Rte. #1, Box 844, Pullman, Wash. 99163; Phuc H. Nguyen, 1735 Pine Hollow Clr., San Jose, Calif. 95133, and Gerald L. Rowley, 7150 Rainbow Dr., #20, San Jose, Calif. 95129

Filed Jul. 1, 1987, Ser. No. 69,288
Int. Cl.[4] G01N *33/533*
U.S. Cl. 436—546 **11 Claims**

1. In a method for the determination of analyte in a sample by means of a specific binding assay, said assay comprising the step of measuring the presence or amount of analyte by detecting or quantitating a fluorescent label present in one of the phases of a two-phase system, the improvement wherein said label is supplied as a compound of the formula:

(4-Fl)—NHCOCR$_2$XL'—Y' or
(5-Fl)—NHCOCR$_2$XL'—Y'

wherein
4-Fl and 5-Fl represent a fluoroscein residue or a substituted fluorescein residue conjugated to the adjacent NH through the 4 or 5 position of the fluorescein nucleus respectively;
each R is independently H or lower alkyl (1–4C);
X is —S—S—$(CH_2)_n$—, wherein n is 1–4;
L' is the residue of L, wherein L is a functional group capable of forming a covalent bond, L being selected from the group consisting of carboxyl, sulfhydryl, amino, halomethyl, epoxide, aldehyde, hydroxy, derivatized carboxyl and vinyl; and
Y' is the residue of Y, wherein Y is a biological ligand or a biological ligand conjugated to linker wherein the linker is capable of reactivity with L.

4,894,349

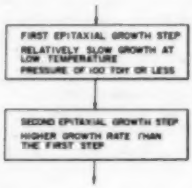
TWO STEP VAPOR-PHASE EPITAXIAL GROWTH PROCESS FOR CONTROL OF AUTODOPING

Yoshihiko Saito, Yokosuka, and Yoshiaki Matsushita, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 15, 1988, Ser. No. 284,512
Claims priority, application Japan, Dec. 18, 1987, 62-320431
Int. Cl.[4] H01L *21/20*
U.S. Cl. 437—95 **10 Claims**

1. A vapor-phase epitaxial growth process comprising:
(i) a step of performing a vapor-phase epitaxial growth at a temperature of 600° C. to 900° C. by using a reaction gas prepared by mixing at least one kind selected from a group consisting of SiH_xF_{4-x} (x=0 to 3) and $Si_2H_xF_{6-x}$ (x=0–5), and at least one kind selected from a group consisting of SiH_4 and Si_2H_6thereby to form a first epitaxial layer on a silicon wafer having a high impurity concentration buried layer containing arsenic (As) or boron (B) as a dopant; and
(ii) a step of performing a vapor-phase epitaxial growth at a growth rate higher than that performed in step (i) by using a reaction gas a group consisting of SiH_4 and Si_2H_6, or a

reaction gas containing at least one kind of the silane and at least one kind of silane fluoride selected from a group


FIRST EPITAXIAL GROWTH STEP
RELATIVELY SLOW GROWTH AT LOW TEMPERATURE
PRESSURE OF 100 TORR OR LESS
SECOND EPITAXIAL GROWTH STEP
HIGHER GROWTH RATE THAN THE FIRST STEP

consisting of SiH_xF_{4-x} (x=0 to 3) and $Si_2H_xF_{6-x}$ (x=0–5), thereby forming a second epitaxial layer on said first epitaxial layer.

4,894,350

METHOD FOR MANUFACTURING OHMIC CONTACTS HAVING LOW TRANSFER RESISTANCES

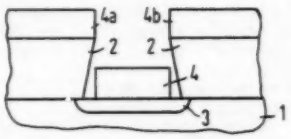
Hans P. Zwicknagl, Stuttgart; Helmut Tews, Unterhaching, and Thomas H. Hager, Munich, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 23, 1988, Ser. No. 248,114

Claims priority, application Fed. Rep. of Germany, Sep. 23, 1987, 3732043

Int. Cl.[4] H01L *29/46, 21/265*

U.S. Cl. 437—184 **3 Claims**



1. A method for manufacturing ohmic contacts having low transfer resistances on a semiconductor layer of a III–V semiconductor material, where the semiconductor layer is first provided with a mask layer and an implantation for producing at least one p-doped region, comprising the steps of:

(a) applying a metallization onto said semiconductor layer material implanted with said p-doping implantation, the metallization being chosen from the group consisting of: titanium, platinum, and titanium in this sequence; titanium and platinum and gold in this sequence; in this sequence; and germanium, gold, chrome, and gold in this sequence;

(b) removing said mask layer and a portion of the metallization situated thereon; and

(c) annealing said implantation and alloying in said metallization simultaneously.

4,894,351

METHOD FOR MAKING A SILICON IC WITH PLANAR DOUBLE LAYER METAL CONDUCTORS SYSTEM

Michael W. Batty, Dresher, Pa., assignor to Sprague Electric Company, North Adams, Mass.

Filed Feb. 16, 1988, Ser. No. 156,048

Int. Cl.[4] H01L *21/00, 21/02;* **B44C** *1/22;* **C03C** *15/00*

U.S. Cl. 437—190 **11 Claims**

1. A method for making a silicon integrated circuit with a double metal film system of conductors comprising:

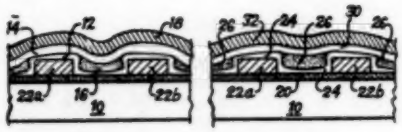
(a) forming over a side of a silicon substrate a first metal film having one and another portion separated by a gap;

(b) depositing a first blanket silicon dioxide layer over said substrate side and said first metal film so that the surface of said first layer has a depression at said gap;

(c) depositing a silica coat directly over said blanket silicon dioxide layer to be thicker at said gap than over said first metal film portions;

(d) spinning on a layer of an organic resin over said silica coat and curing said resin;

(e) using an etching process for removing at about the same



rate said resin, said silica and said silicon dioxide, etching until said resin coating is entirely removed and until at areas over which said resin layer had been thinnest prior to said etching, said silica coat is removed and the exposed regions of said first blanket silicon dioxide layer are thinned;

(f) depositing a second silicon dioxide layer, and

(g) forming over said second silicon dioxide layer a second metal film.

4,894,352

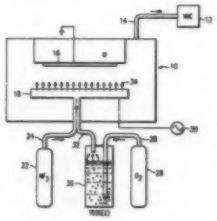
DEPOSITION OF SILICON-CONTAINING FILMS USING ORGANOSILICON COMPOUNDS AND NITROGEN TRIFLUORIDE

Andrew P. Lane, Westminster; Douglas A. Webb, Allen, and Gene R. Frederick, Mesquite, all of Tex., assignors to Texas Instruments Inc., Dallas, Tex.

Filed Oct. 26, 1988, Ser. No. 263,162

Int. Cl.[4] H01L *21/00, 21/02, 21/56, 21/425*

U.S. Cl. 437—238 **40 Claims**



1. A composition for depositing a layer of silicon-containing compound on a substrate within a low-pressure reactor, comprising:

between about four and about seventy percent by volume of an organosilicon gas compound; and

between about two percent and about seventy percent by volume of nitrogen trifluoride.

4,894,353

METHOD OF FABRICATING PASSIVATED TUNNEL OXIDE

Effiong E. Ibok, Austin, Tex., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

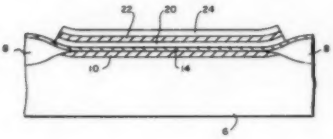
Filed Apr. 29, 1988, Ser. No. 187,738

Int. Cl.[4] H01L *21/316*

U.S. Cl. 437—239 **16 Claims**

1. A method of fabricating a high-quality oxide layer on a substrate, comprising the sequential steps of:

(a) oxidizing the substrate in an atmosphere comprising oxygen and nitrogen at a temperature greater than or equal to 950° C. and less than or equal to 1000° C.; and



(b) oxidizing the substrate in an atmosphere comprising HCl, oxygen, and argon (Ar) at a temperature greater than 1050° C., said steps (a) and (b) being conducted for times sufficient to form an oxide layer having a total thickness of less than 200 Å.

4,894,354

METHOD OF MAKING A CONVERSION CATALYST HAVING AN ANATASE VANADIUM PASSIVATING AGENT FOR TREATING A HEAVY HYDROCARBON FEEDSTOCK

Nelson P. Martinez, San Antonio de Los Altos; Jose R. Velasquez, and Juan A. Lujano, both of Caracas, all of Venezuela, assignors to Intevep, S.A., Caracas, Venezuela

Division of Ser. No. 109,409, Oct. 19, 1987, Pat. No. 4,816,135, and a continuation-in-part of Ser. No. 864,812, May 19, 1986, Pat. No. 4,704,375. This application Oct. 28, 1988, Ser. No. 263,814

Int. Cl.[4] B01J *29/06*

U.S. Cl. 502—64 **8 Claims**

1. A method for the preparation of a cracking catalyst for use in the demetallization of hydrocarbon feeds characterized by a vanadium concentration of at least 1.0 ppm consisting essentially of: providing a matrix material with added aluminosilicate zeolite; diluting said matrix in water so as to form a slurry; preparing a vanadium passivating agent containing a stabilized anatase crystalline form of TiO_2 as TiO_2/P_2O_5, $TiO_2/SO_4^{=}$, TiO_2/Nb_2O_5 and mixtures thereof; and impregnating said matrix with said vanadium passivating agent.

4,894,355

FLEXIBLE, WATER-REPELLENT BAKED CARBON PLATE, ITS PRODUCTION, FUEL CELL ELECTRODE, FUEL CELL ELECTRODE PLATE AND ITS PRODUCTION AND FUEL CELL

Seiji Takeuchi, Hitachiohta; Katsuya Ebara, Mito; Tomoichi Kamo, Ibaraki; Kazuo Iwamoto, Hitachi; Tatsuo Horiba, Hitachi; Teruo Kumagai, Hitachi; Kouki Tamura, Hitachi, and Kunko Kitami, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Division of Ser. No. 787,117, Oct. 15, 1985. This application Jan. 20, 1988, Ser. No. 146,192

Claims priority, application Japan, Oct. 17, 1984, 59-216229; Dec. 20, 1984, 59-269424

Int. Cl.[4] H01M *4/88*; **B05D** *5/12*

U.S. Cl. 502—101 **20 Claims**

11. A process of producing a flexible fuel cell electrode, comprising the steps of:

preparing a carbon paper comprising carbon fiber and a carbonized binder made from an organic binder;

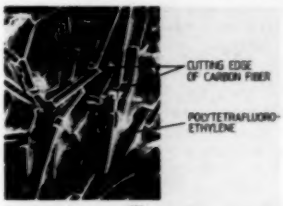
infiltrating a suspension of polytetrafluoroethylene into the carbon paper so as to provide a carbon paper impregnated with polytetrafluoroethylene;

kneading a mixture of catalyst powder and a polytetrafluoroethylene dispersion to provide a paste catalyst;

coating the paste catalyst on the carbon paper;

baking the coated carbon paper impregnated with polytetrafluoroethylene at a temperature more than a melting point temperature of the polytetrafluoroethylene and not more than a decomposition temperature thereof; and

reducing thickness of the coated carbon paper to cut the carbon fiber so as to provide a number of cutting edges



thereof and to cause the polytetrafluoroethylene to infiltrate into the cutting edges to bind the carbon fiber having the cutting edges, thereby providing a flexible fuel cell electrode comprising a baked carbon plate and a catalyst layer thereon.

4,894,356

CATALYSTS FOR AIR-DRYING COMPOSITIONS

Christopher J. Hardiman, Belchertown, Mass., assignor to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 49,752, May 13, 1987, Pat. No. 4,826,923. This application Dec. 19, 1988, Ser. No. 286,412

Int. Cl.[4] B01J *31/16, 31/04*

U.S. Cl. 502—170 **3 Claims**

1. A free radical polymerization catalyst comprising a fatty acid salt of cobalt or manganese and at least one acetylacetonate of niobium, zirconium, titanium, tungsten, or aluminum, wherein said acetylacetonate has a solubility in methyl ethyl ketone, ethanol or toluene of at least about 0.1 percent by weight.

4,894,357

PROCESS FOR ADJUSTING THE STRUCTURAL AND/OR SURFACE CHARACTER OF OXIDES

Bernd Hupe, Hameln, and Robert Walter, Langenhagen, both of Fed. Rep. of Germany, assignors to Kali-Chemie Aktiengesellschaft, Hanover, Fed. Rep. of Germany

Filed Oct. 31, 1985, Ser. No. 793,206

Claims priority, application Fed. Rep. of Germany, Nov. 2, 1984, 3440018

Int. Cl.[4] C01B *35/158, 33/16*; **B01J** *21/06, 21/04*

U.S. Cl. 502—233 **18 Claims**

1. A process for dehydration of a water-containing, inorganic oxide gel under supercritical conditions, wherein a water-containing, inorganic oxide gel having a water content from about 30 to about 95 weight percent is produced by combining an aqueous solution of a salt selected from the group consisting of salts of magnesium, aluminum, silicon, zinc, titanium, zirconium, hafnium and mixtures thereof with an inorganic acid followed by base exchange treatment, and is dehydrated to a free water content of less than 1 percent by treatment with an extraction agent which is gaseous at standard temperature and pressure, and said treatment is carried out at a pressure above the critical pressure of the extraction agent.

2. A process according to claim 1, wherein the oxide gel is formed of material selected from the group consisting of oxides of magnesium, aluminum, silicon, zinc, titanium, zirconium, hafnium, and mixtures of one or more of the foregoing.

15. A process for dehydration of a water-containing, inorganic oxide gel under supercritical conditions, wherein an inorganic oxide gel comprising a solvent having a water content of at least 50 weight percent of the total solvent, whereby said gel comprises at least about 30 weight percent water, is produced by combining an aqueous solution of a salt selected from the group consisting of salts of magnesium, aluminum,

silicon, zinc, titanium, zirconium, hafnium and mixtures thereof with an inorganic acid followed by base exchange treatment, and is dehydration to a free water content of less than 1 percent by treatment with an extraction agent which is gaseous at standard temperature and pressure, and said treatment is carried out at a pressure above the critical pressure of the extraction agent.

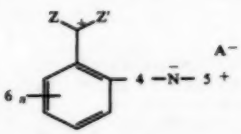
4,894,358

THERMAL IMAGING WITH YLIDE DYES

Michael P. Filosa, Medfield; Stephen R. Herchen, Duxbury, and Cheryl P. Petersen, Acton, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Aug. 31, 1988, Ser. No. 238,476
Int. Cl.[4] B41M 5/18
U.S. Cl. 503—201 **10 Claims**

1. A heat responsive recording medium comprising a support carrying a recording layer comprising a film-forming binder and a colored dye ylide of the formula



said dye compound when heated to a temperature above 100° C. cleaves at the —N- 5 + bond with 5 departing and with the nitrogen atom bonding to the meso carbon atom to form a 5- or 6-membered ring and rendering the compound colorless, wherein:

Z and Z' taken individually represent the moieties to complete the auxochromophoric system of a triarylmethane dye and Z and Z' when taken together represent the bridged moieties to complete the auxochromophoric system of a bridged triarylmethane dye;

4 is carbonyl, sulfonyl or a methylene or ethylene radical, substituted or unsubstituted;

5 + is

6 is hydrogen or a monovalent radical, n being 1, 2, 3, or 4;

8 are substituted or unsubstituted aryl groups;

9 represents the atoms to complete a heterocyclic ring or ring system, substituted or unsubstituted; and

A— is an anion.

2. A thermal imaging method which comprises heating imagewise to a temperature above at least 100° C. the heat responsive recording medium of claim 1 whereby said dye compound is rendered colorless in an imagewise pattern corresponding to said imagewise heating.

4,894,359

HEAT-SENSITIVE RECORDING PAPER

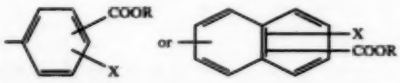
Ryuzo Ueno, Nishinomiya; Shinichi Katsura, Toyonaka; Yoshiro Uchiyama, Nishinomiya, and Satomi Inoue, Osaka, all of Japan, assignors to Kabushiki Kaisha Ueno Seiyaku Oyo Kenkyujo, Japan

Division of Ser. No. 66,476, Jun. 26, 1987, Pat. No. 4,855,482. This application May 31, 1988, Ser. No. 200,553
Claims priority, application Japan, Feb. 7, 1986, 61-154233
Int. Cl.[4] B41M 5/18
U.S. Cl. 503—209 **10 Claims**

1. A heat sensitive recording paper which contains in its heat sensitive layer a leuco dye, developer, and either of a bis(-phenoxymethyl)benzene derivative or bis(naphthoxymethyl)-benzene derivative having the general formula (I):

(I)

wherein: A represents a group ,



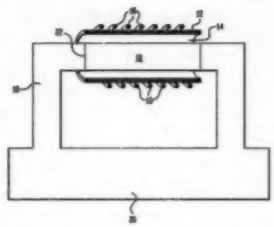
where R represents a C_1–C_4 alkyl group, a phenyl group or benzyl group, and X represents hydrogen atom or halogen atom.

4,894,360

METHOD OF USING A FERROMAGNET MATERIAL HAVING A HIGH PERMEABILITY AND SATURATION MAGNETIZATION AT LOW TEMPERATURES

Herbert A. Leupold, Eatontown, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 19, 1989, Ser. No. 355,582
Int. Cl.[4] H01F 7/22
U.S. Cl. 505—1 **8 Claims**



1. Method of using a ferromagnet material having a high permeability and saturation magnetization to induce superconducting currents in a ring of superconductive material where the ferromagnet material has a lower transition temperature than the superconductive material, said method including the steps of:

(A) placing a bar of a ferromagnet material in an annular ring of a superconductive material at a temperature above both the transition temperature of the ferromagnet material and the transition temperature of the superconductive material,

(B) applying an axial magnetic field of sufficient strength to saturate the ferromagnet when the ferromagnet is cooled below its transition temperature,

(C) cooling the ferromagnet to below its transition temperature without cooling the superconductive material so that the superconductive material does not become superconducting before the saturation of the ferromagnet,

(D) cooling the superconductive material to below its transition temperature,

(E) removing the ferromagnet and the applied field, and

(F) allowing the system to warm to a convenient operating temperature which must be below the transition temperature of the superconductive material.

4,894,361

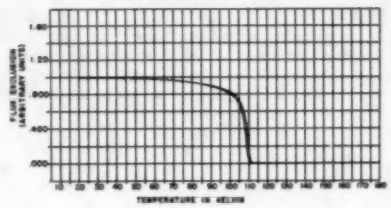
SUPERCONDUCTING METAL OXIDE TL-PB-CA-SR-O COMPOSITIONS AND PROCESSES FOR MANUFACTURE AND USE

Munirpallam A. Subramanian, New Castle, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 230,631, Aug. 10, 1988, abandoned. This application Aug. 24, 1988, Ser. No. 236,088

Int. Cl.[4] C01F *11/02;* **C01G** *3/02, 21/00;* **H01L** *39/12*

U.S. Cl. 505—1 **4 Claims**



1. A superconducting composition having the nominal formula

$$Tl_aPb_bCa_cSr_dCu_eO_x$$

wherein

a is from about 1/10 to 3/2,

b is from about 1 to 4,

c is from about 1 to 3

d is from about 1 to 5

e is from about 3/10 to 1

x=(a+b+c+d+e+y)

where

y is from about ½ to 3,

said composition having a superconducting transition temperature of at least 70 K.

4,894,362

EEL GROWTH HORMONE

Kazuo Yamaguchi, Sagamihara; Akiko Saito, Machida; Susumu Sekine, Machida; Moriyuki Sato, Machida; Seiga Itoh, Sagamihara; Kunikatsu Shirahata, Komae; Tetsuya Hirano, Tokyo, and Hiroshi Kawauchi, Iwate, all of Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan

Filed Jul. 8, 1986, Ser. No. 883,051

Claims priority, application Japan, Jul. 10, 1985, 60-151847; Jul. 22, 1985, 60-161429; Mar. 31, 1986, 61-74061

Int. Cl.[4] C07K *7/10;* **A61K** *37/02*

U.S. Cl. 514—12 **10 Claims**

1. An essentially pure fish growth hormone derived from *Anguilla japonica* which is a polypeptide having the following physicochemical properties:

(i) Amino acid composition: as indicated in Column A, Table 1;

(ii) The sequence of the amino acids is as follows:

H_2N—Val—Glu—Pro—Ile—Ser—Leu—Tyr—Asn—Leu—Phe—Thr—Ser—Ala—Val—Asn—Arg—Ala—Gln—His—Leu—His—Thr—Leu—Ala—Ala—Glu—Ile—Tyr—Lys—Glu—Phe—Glu—Arg—Ser—Ile—Pro—Pro—Glu—Ala—His—Arg—Gln—Leu—Ser—Lys—Thr—Ser—Pro—Leu—Ala—Gly—Cys—Tyr—Ser—Asp—Ser—Ile—Pro—Thr—Pro—Thr—Gly—Lys—Asp—Glu—Thr—Gln—Glu—Lys—Ser—Asp—Gly—Tyr—Leu—Leu—Arg—Ile—Ser—Ser—Ala—Leu—Ile—Gln—Ser—Trp—Val—Tyr—Pro—Leu—Lys—Thr—Leu—Ser—Asp—Ala—Phe—Ser—Asn—Ser—Leu—Met—Phe—Gly—Thr—Ser—Asp—Gly—Ile—Phe—Asp—Lys—Leu—Glu—Asp—Leu—Asn—Lys—Gly—Ile—Asn—Glu—Leu—Met—Lys—Val—Val—Gly—Asp—Gly—Gly—Ile—Tyr—Ile—Glu—Asp—Val—Arg—Asn—Leu—Arg—Tyr—Glu—Asn—Phe—Asp—Val—His—Leu—Arg—Asn—Asp—Ala—

-continued

Gly—Leu—Met—Lys—Asn—Tyr—Gly—Leu—Leu—Ala—Cys—Phe—Lys—Lys—Asp—Met—His—Lys—Val—Glu—Thr—Tyr—Leu—Lys—Val—Thr—Lys—Cys—Arg—Arg—Phe—Val—Glu—Ser—Asn—Cys—Thr—Leu—OH;

(iii) Molecular weight: about 23,000;

(iv) Isoelectric point: 6.3;

(v) Soluble in an alkaline aqueous solution and hardly soluble or insoluble in neutral and acidic aqueous solutions;

(vi) Classification as basic or acidic properties: acidic polypeptide;

(vii) Color and form of substance: white powder; and

(viii) Polyacrylamide gel electrophoresis: a single band.

4,894,363

DERIVATIVES OF SEROTONIN

László Mester, and Madeleine Mester nee Szadeczky-Kardoss, both of 3 Parc de Béaru, Saint-Cloud, France (92210)

Continuation of Ser. No. 944,577, Dec. 22, 1986, abandoned. This application Feb. 3, 1988, Ser. No. 151,815

Claims priority, application France, Jul. 18, 1975, 75 22577

Int. Cl.[4] A61K *31/70;* **C07H** *5/06*

U.S. Cl. 514—23 **4 Claims**

1. A serotonin derivative in which at least one of the atoms of hydrogen of the primary amino group of serotonin is substituted by a 1-desoxy sugar selected from the group consisting of tagarose, ribulose, xylulose, and their water-soluble physiologically acceptable salts.

4,894,364

METHOD AND MATERIALS FOR SENSITIZING NEOPLASTIC TISSUE TO RADIATION

Sheldon B. Greer, 8320 SW 86 Ter., Miami, Fla. 33143

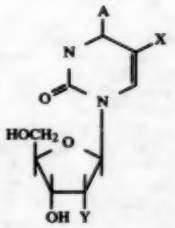
PCT No. PCT/US84/01735, § 371 Date Oct. 26, 1984, § 102(e) Date Jan. 1, 1901, PCT Pub. No. WO85/01871, PCT Pub. Date May 9, 1985

Continuation-in-part of Ser. No. 545,693, Oct. 26, 1983, abandoned. This PCT application Oct. 26, 1984, Ser. No. 749,540

Int. Cl.[4] A61B *19/00;* **C07H** *17/00;* **A61K** *31/70*

U.S. Cl. 514—49 **11 Claims**

1. A method of sensitizing susceptible tumor tissue to x-ray, gamma, beta, ultraviolet light, or near visible light (313 nm) radiation, said tissue having elevated levels of cytidine deaminase, deoxycytidine kinase, dCMP deaminase, or combinations thereof, which comprises administering to a patient having such tissue a radiation-sensitizing amount of a deoxycytidine compound of the formula:



wherein A is $—NH_2$; X is chloro; Y is hydrogen ——— is a double bond; and a systemic deamination-preventing amount of a deamination inhibitor selected from the group containing of tetrahydrouridine and 2'-deoxytetrahydrouridine.

4,894,365
COMBINATIONS OF FU AND BVU AS ANTI-ADENOCARCINOMA AGENTS

Erik De Clercq, Leuven, Belgium, and Masaaki Iigo, Kitamoto, Japan, assignors to Stichting Rega VZW, Leuven, Belgium

Filed Feb. 11, 1988, Ser. No. 154,193
Claims priority, application Netherlands, Feb. 13, 1987, 8700366
Int. Cl.[4] A61K *31/70, 31/505*
U.S. Cl. 514—50 6 Claims

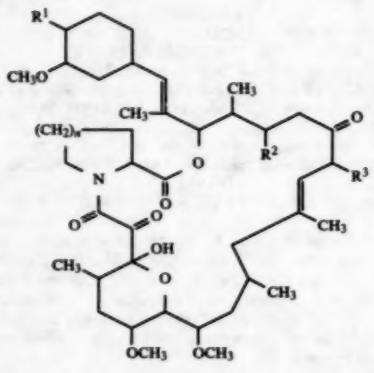
1. A method for treating adenocarcinomas which comprises administering to a patient an effective amount of an active ingredient for reducing adenocarcinoma tumor weight selected from the group consisting of 5-fluorouracil and N_1-(2'-tetrahydrofuryl)-5-fluorouracil, in combination with an effective amount of an ingredient for potentiating said active ingredient, said potentiating ingredient being selected from the group consisting of (E)-5-(2-bromovinyl)-uracil and (E)-5-(2-bromovinyl)-2'-deoxyuridine.

4,894,366
TRICYCLO COMPOUNDS, A PROCESS FOR THEIR PRODUCTION AND A PHARMACEUTICAL COMPOSITION CONTAINING THE SAME

Masakuni Okuhara; Hirokazu Tanaka; Toshio Goto, all of Ibaraki; Tohru Kino, Tsuchiura, and Hiroshi Hatanaka, Ibaraki, all of Japan, assignors to Fujisawa Pharmaceutical Company, Ltd., Osaka, Japan

Filed Nov. 20, 1985, Ser. No. 799,855
Claims priority, application United Kingdom, Dec. 3, 1984, 8430455; Feb. 5, 1985, 8502869; Apr. 1, 1985, 8508420
Int. Cl.[4] A61K *31/395, 31/695;* C07D *498/16;* C07F *7/04*
U.S. Cl. 514—63 12 Claims

1. A compound of the formula:



(I)

wherein

R^1 is hydroxy or pharmaceutically acceptable protected hydroxy selected from 1-(lower alkylthio)(lower)alkyloxy, tri(lower)alkylsilyloxy, lower alkyl-diphenylsilyloxy, pharmaceutically acceptable organic carboxylic acyloxy and pharmaceutically acceptable organic sulfonic acyloxy,

R^2 is hydrogen, hydroxy or lower alkanoyloxy,

R^3 is methyl, ethyl, propyl or allyl,

n is an integer of 1 or 2, and

the symbol of a line and dotted line is a single bond or a double bond, provided that when R^1 and R^2 are each hydroxy, n is an integer of 2 and the symbol of a line and dotted line is a single bond, then R^3 is methyl, propyl or allyl, and a pharmaceutically acceptable basic salt thereof.

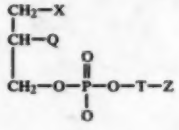
12. An immunosuppressive or antimicrobial pharmaceutical composition containing an effective amount of a compound of claim 1, as an active ingredient, in association with a pharmaceutically acceptable, substantially non-toxic carrier or excipient.

4,894,367
ANTIHYPERTENSIVE PHOSPHATE DERIVATIVES

Allan Wissner, Ardsley; Phaik E. Sum, New York, both of N.Y., and Robert E. Schaub, Upper Saddle River, N.J., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 679,788, Dec. 10, 1984, Pat. No. 4,762,942.
This application Jul. 18, 1988, Ser. No. 194,748
Int. Cl.[4] A61K *31/685*
U.S. Cl. 514—78 12 Claims

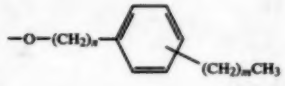
1. A method of treating hypertension in a warm-blooded animal comprising administering to said animal on effective amount of a compound, including the individual R and S enantiomers and racemic mixture, represented by the formula:



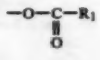
wherein: X is selected from the group consisting of

C_1–C_{24} branched or straight chain alkyl;

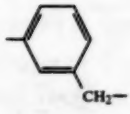
C_1–C_{24} branched or straight chain alkoxy;



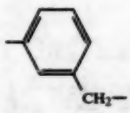
wherein n and m are integers from 0 to 25 and the sum of n and m is less than or equal to 25; substituted phenoxy, wherein the substituents are selected from the group consisting of halogen, trifluoromethyl, phenyl and substituted phenyl; Q is selected from the group consisting of:



wherein R_1 is selected from the group consisting of hydrogen, C_1–C_4 branched or straight chain alkyl, C_1–C_4 branched or straight chain alkoxy and C_1–C_4 branched or straight chain alkylamino; T is a bivalent radical selected from the group consisting of $-(CHR)_p-$ and



wherein p is an integer from 1 to 15, the moiety $-(CHR)_p-$ represents an alkylene chain substituted at any position with one or more C_1–C_{10} alkyl groups or phenyl groups, and the moiety



is bound with the oxygen atom attached directly to the aromatic ring; and Z is

$-N^{+}(R_2)_3$

wherein R_2 is hydrogen or C_1–C_4 branched or straight chain alkyl.

4,894,368

CERTAIN TRIPHENYLPHOSPHINIMIDE DERIVATIVES

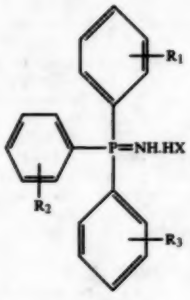
Andrew S. Tomcufcik, Bergen; John E. Emma, Rockland; Nancy H. Eudy, Orange; Joseph W. Marsico, and Howard Newman, both of Rockland, all of N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 888,613, Jul. 23, 1986, Pat. No. 4,767,749. This application Jun. 17, 1988, Ser. No. 207,846

Int. Cl.[4] C07F *9/02*; A61K *33/42*

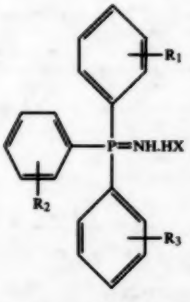
U.S. Cl. 514—137 **5 Claims**

1. A compound selected from those of the formula:



wherein R_1, R_2 and R_3 are each at the ortho or meta position and are selected from hydrogen and alkyl(C_1–C_3); and X is an pharmaceutically acceptable acid addition salt.

5. A pharmaceutical composition of matter in dosage unit form comprising from about 10 mg to 500 mg of a compound selected from those of the formula:



wherein R_1, R_2 and R_3 are each at the ortho or meta position and are selected from hydrogen and alkyl(C_1–C_3); and X is an pharmaceutically acceptable acid addition salt in association with a pharmaceutically acceptable carrier.

4,894,369

NOVEL 2β-MORPHOLINO-ANDROSTANE DERIVATIVES

Thomas Sleigh, Wishaw; David S. Savage, New Mearns, and Ian C. Carlyle, Hamilton, all of Scotland, assignors to Akzo N.V., Arnhem, Netherlands

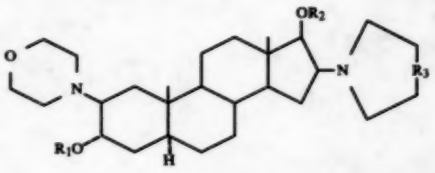
Filed Apr. 13, 1988, Ser. No. 181,139

Claims priority, application United Kingdom, Apr. 14, 1987, 8708886

Int. Cl.[4] A61K *31/58*; C07J *71/00, 43/00*

U.S. Cl. 514—176 **6 Claims**

1. Compounds having the formula:



wherein R_1 is H or an optionally substituted acyl group having 1–12 carbon atoms,

R_2 is H or an acyl group having 1–12 carbon atoms and

R_3 is C, N—CH_3 or a direct bond, and mono- or bisquaternary ammonium compounds thereof and acid addition salts of the non- or mono-quaternary ammonium compounds.

4,894,370

COMPOSITIONS HAVING FERMENTATION ANALOGS OF VIRGINIAMYCIN M_1 AS ACTIVE INGREDIENT

Yiu-kuen T. Lam, Plainsboro, N.J.; Raymond S. Chang, Lansdale, Pa.; Otto D. Hensens, Red Bank, N.J.; Cheryl D. Schwartz, Westfield, N.J., and Deborah L. Zink, Manalapan, N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 934,231, Mar. 25, 1988, Pat. No. 4,762,923. This application Mar. 25, 1988, Ser. No. 173,342

The portion of the term of this patent subsequent to Sep. 20, 2005, has been disclaimed.

Int. Cl.[4] A61K *31/42, 31/33*

U.S. Cl. 514—183 **9 Claims**

1. A pharmaceutical composition useful for treating gastrointestinal disorders, central nervous system disorders and regulating appetite in mammals comprising a pharmaceutically effective amount of virginiamycin M_1 and an acceptable pharmaceutical carrier.

4,894,371

3-SUBSTITUTED-AMINOMETHYL CEPHALOSPORIN DERIVATIVES

Frederic H. Jung, Rilly la Montagne, France, assignor to ICI Pharma, Cergy Cedex, France

Continuation of Ser. No. 800,112, Nov. 20, 1985, abandoned. This application Dec. 9, 1986, Ser. No. 940,161

Claims priority, application European Pat. Off., Nov. 29, 1984, 84402449.7

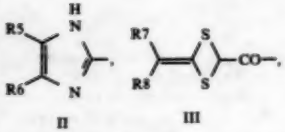
The portion of the term of this patent subsequent to Jul. 7, 2004, has been disclaimed.

Int. Cl.[4] C07D *501.18*; A61K *31/545*

U.S. Cl. 514—202 **9 Claims**

1. A cephalosporin of the formula

in which
X is sulphur or sulphinyl (R or S configuration);
—R1 is of the formula

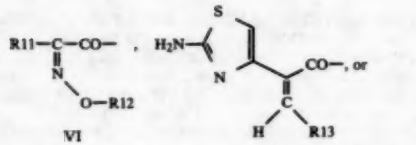


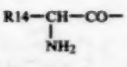
in which R5 and R6, same or different, are hydrogen, halogen, cyano, hydroxy, carboxy, pyridyl, (1–6C)alkyl, (1–6C-)aminoalkyl, (1–6C)hydroxyalkyl, (2–6C)alkoxycarbonyl, (2–10C)alkylaminoalkyl, (3–15C)dialkylaminoalkyl, or phenyl optionally substituted by 1 or 2 radicals selected from halogen, nitro, amino, hydroxy, carboxy, cyano, (1–6C)alkyl and (2–6C)alkoxycarbonyl;

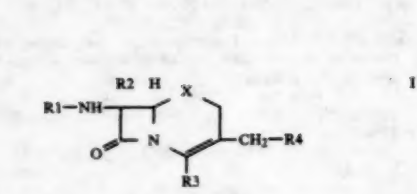
R7 is carboxy, (2–6C)alkoxycarbonyl, benzyloxycarbonyl, carbamoyl, (2–6C)alkylcarbamoyl, (3–8C)dialkylcarbamoyl, carbazoyl, cyano or (2–6C)alkoxycarbonylamino;

R8 is hydrogen, (1–4C)alkyl, (1–4C)alkoxy, (2–5C)alkanoyl, (1–4C)alkylthio, (1–4C)-alkanesulphinyl, (1–4C)alkanesulphonyl, phenyl, benzoyl, carboxy, (2–6C)alkoxycarbonyl, benzyloxycarbonyl, carbamoyl, carbazolyl, cyano, (2–5C-)alkenyl, sulphamoyl, (1–4C)hydroxyalkyl, (2–4C)carboxyalkyl, benzyl, hydroxyphenyl, [(1–4C)alkoxy]phenyl, pyridyl or (methylthio)thiadiazolyl, the point of attachment of said pyridyl or (methylthio)thiadiazolyl being a carbon atom;

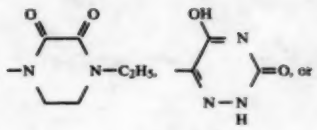
R9 is hydrogen, (1–6C)alkyl or phenyl;
R10 is of the formula



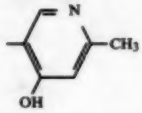




I



IX X



XI

R11 is 2-aminothiazol-4-yl or 2-aminooxazol-4-yl each optionally substituted in the 5-position by fluorine, chlorine or bromine, or R11 is 5-aminoisothiazol-3-yl, 5-amino-1,2,4-thiadiazol-3-yl, 3-amino-pyrazol-5-yl, 3-aminopyrazol-4-yl, 2-aminopyrimidin-5-yl, 2-aminopyrid-6-yl, 4-aminopyrimidin-2-yl, 2-amino-1,3,4-thiadiazol-5-yl or 5-amino-1-methyl-1,2,4-triazol-3-yl;

R12 is hydrogen, (1–6C)alkyl, (3–8C)cycloalkyl, (1–3C)alkyl(-3–6C)cycloalkyl, (3–6C)cycloalkyl-(1–3C)alkyl, (3–6C) alkenyl, (5–8C)cycloalkenyl, (3–6C)alkynyl, (2–5C)alkylcarbamoyl, phenylcarbamoyl, benzylcarbamoyl, triphenylmethyl, (1–3C)haloalkyl, (2–6C)hydroxyalkyl, (1–4C)alkoxy(2–4C)alkyl, (1–4C)alkylthio(2–4C) alkyl, (1–4C(alkanesulphinyl-(1–4C)alkyl, (1–4C)alkanesulphonyl(1–4C)alkyl, (2–6C)aminoalkyl, (1–4C)alkylamino(2–6C)alkyl, (2–8C-)dialkylamino(2–6C) alkyl, (1–5C)cyanoalkyl, (1–4C-)azidoalkyl, (2–5C)ureidoalkyl, 3-amino-3-carboxypropyl, 2-(amidinothio)ethyl, 2-(N-aminoamidinothio)ethyl, tetrahydropyran-2-yl, thietan-3-yl or 2-oxotetrahydrofuran-3-yl,

or —R12 is of the formula —$(CH_2)_N$—R15 in which n is 1 to 4 and R15 is piperidino, pyrrolidino, morpholino, piperazino or N-methylpiperazino, each value of R15 being optionally substituted by (1–4C)alkyl, phenyl or benzyl,

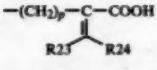
or —R12 is of the formula —$(CH_2)_m$—W—R16 in which m is 0 to 3, W is sulphur or a direct bond, and R16 is phenyl or pyridinio(1–4C)alkylene or R16 is pyridyl, imidazolyl, 1,3,4-thiadiazolyl tetrazolyl, 1-(1–4C)-alkyltetrazolyl thiazolyl, isothiazolyl or isoxazolyl in which the link with W is via a carbon or uncharged nitrogen, each value of R16 being optionally substituted, where possible, by one or two groups selected from (1–4C) alkyl, amino, hydroxy, carboxy, carbamoyl, nitro, (2–5C)alkoxycarbonyl, cyano and sulpho,

or —R12 is of the formula —$(CH_2)_n$—CO—R17 in which n is 1 to 4 and R17 is (1–4C)alkyl, phenyl or benzyl,

or —R12 is of the formula —COR18 or —$(CH_2)_N$—OCO—R18 in which n is 1–4 and R18 is hydrogen, (1–4C)alkyl, (1–4C)haloalkyl, phenyl or benzyl,

or —R12 is of the formula —G—CH_2—R19 in which G is carbonyl or a direct bond and R19 is phthalimido,

or —R12 is of the formula



XII

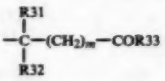
in which p is 1 or 2 and R23 and R24 are hydrogen or (1–4-C)alkyl,

or —R12 is of the formula —P(O)R25R26 in which R25 is hydroxy, (1–4C)alkoxy, (2–8C)dialkylamino, phenoxy phenylamino or one of the values given above for R15, and R26 is (1–4C)alkyl, (1–4C)alkoxy, (2–8C)dialkylamino, phenoxy, phenylamino, piperidinyl, pyrrolidinyl, morpholinyl, piperazinyl or N-methyl-piperazinyl,

or —R12 is of the formula —$CH_2P(O)R27R28$ in which R27 and R28 are hydroxy or (1–4C)alkoxy,

or —R12 is of the formula —CH(SR29)COOR30 in which R29 is (1–4C)alkyl and R30 is hydrogen or (1–6C)alkyl,

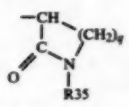
or —R12 is of the formula



XIII

in which m is 0–3, R31 is hydrogen, (1–3C)alkyl or methylthio, R32 is hydrogen, (1–3C)alkyl, (3–7C) cycloalkyl, cyano, carboxy, (2–5C)carboxyalkyl or methanesulphonylamino, or phenyl optionally substituted by amino or hydroxy, or R31 and R32 are joined to form, together with the carbon to which they are attached, a (3–7C)carbocyclic ring and R33 is hydroxy, amino, (1–4C)alkoxy, (1–4C)alkylamino, phenylamino or of the formula R15 given above or of the formula NHOR34 in which R34 is hydrogen, (1–4C)alkyl, phenyl or benzyl,

or —R12 is of the formula



XIV

in which q is 2 or 3 and R35 is hydrogen or (1–6C)alkyl,

provided that when R12 contains phenyl, and unless otherwise stated, the phenyl is optionally substituted by 1 or 2 groups selected from halogen, hydroxy, amino, carboxy, nitro, carbamoyl, cyano and aminomethyl;

R13 is hydrogen or of the formula R39-Y- in which Y is a direct bond or of the formula $S(O)_p$ in which p is 1 or 2 and R39 is (1–6C)alkyl or (3–8C)cycloalkyl each optionally substituted by (1–6C)alkyl, (1–6C)alkoxy, (1–6C)alkylthio, (1–6C)alkylamino, (2–8C)dialkylamino, (2–6C)alkoxycarbonyl or phenyl, the phenyl itself being optionally substituted by halogen, (1–6C)alkyl, (1–6C)alkoxy, (1–6C)alkylthio, (1–6C)alkylamino, (2–8C)dialkylamino or (2–6C)alkoxycarbonyl,

or R39 is phenyl optionally substituted by one to four substituents selected from halogen, (1–6C)alkyl, hydroxy, trifluoromethyl, nitro, cyano, (1–6C)alkoxy, (1–6C)alkylthio, carboxy, (2–6C)alkoxycarbonyl, carbamoyloxy and sulpho,

or R39 is a monocyclic or bicyclic heterocyclic aromatic ring system selected from thiophene, furan, imidazole, thiazole, pyridine, pyrimidine, benzthiophene or benzfuran, said heterocyclic system being optionally substituted by halogen, (1–6C)alkyl, (1–6C)alkoxy, (1–6C)alkylthio, (1–6C)alkylamino, (2–8C)dialkylamino or (2–6C)alkoxycarbonyl,

and when Y is of the formula $S(O)_p$ R39 may also be hydroxy,

or R13 is halogen, cyano, carbamoyl, (1–6C) alkylthio or (1–6C) alkoxycarboimidoyl,

or —R13 is of the formula —Z—R40 in which Z is oxygen or sulphur and R40 is hydrogen or (1–6C)alkyl or (2–6C)alkenyl each of which is optionally substituted by one or two substituents selected from hydroxy, cyano, carbamoyl and COOR41 in which R41 is hydrogen, (1–6C)alkyl, acetoxymethyl, t-butyl, diphenylmethyl, p-methoxybenzyl, p-nitrobenzyl, triphenylmethyl or tri(1–4C)alkylsilyl;

R14 is phenyl, benzthienyl or naphthyl, each optionally substituted on a benzene ring by halogen, hydroxy, nitro, amino, methylenedioxy, (1–4C)alkyl, (1–4C)alkoxy, (1–4C)alkanoylamino or (1–4C)alkyl-sulphonylamino, or R14 is furyl, thienyl or cyclohexa-1,2,4,5-dienyl;

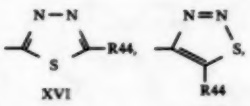
R2 is hydrogen, methoxy or formylamino;

R3 is carboxy or a biodegradeable ester thereof;

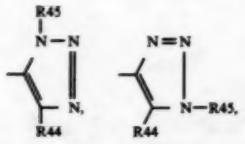
R4 is of the formula —NR42R43 in which

R42 is hydrogen, (1–4C)alkyl or benzyl;

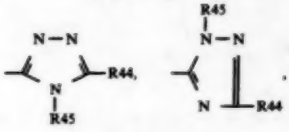
—R43 is a non-positively charged heterocycle of the formula



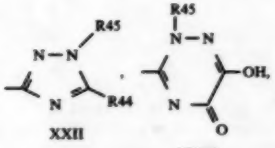
XVI XVII



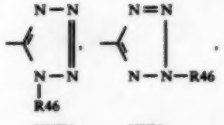
XVIII XIX



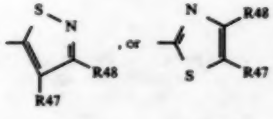
XX XXI



XXII XXIII



XXIV XXV



XXVI XXVII

in which R44 and R45 are selected from hydrogen and (1–6C)alkyl;

R46 is hydrogen, (1–6C)alkyl, (2–6C)carboxyalkyl, (1–6C)sulphoalkyl, (2–6C)aminoalkyl, (1–4C)alkylamino-(2–6C)alkyl, (2–8C)dialkylamino(1–6C)alkyl, (2–6C)hydroxyalkyl or (1–6C)sulphoaminoalkyl;

R47 and R48 are selected from hydrogen, cyano, (1–6C)alkyl, hydroxy, carboxy and (2–6C)carboxyalkyl, provided that at least one of R47 and R48 is hydroxy, carboxy or carboxyalkyl;

and the pharmaceutically-acceptable base addition salts thereof.

4,894,372

PYRIDINE COMPOUNDS WHICH HAVE USEFUL HISTAMINE-H_2 ANTAGONIST ACTIVITY

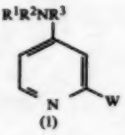
David G. Cooper, Letchworth, and George S. Sach, Welwyn, both of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

Division of Ser. No. 793,510, Oct. 31, 1985, Pat. No. 4,758,576, which is a division of Ser. No. 473,520, Mar. 9, 1983, Pat. No. 4,574,126. This application Apr. 19, 1988, Ser. No. 183,567

Int. Cl.[4] A61K *31/55, 31/44;* C07D *213/53, 401/12*

U.S. Cl. 514—212 9 Claims

1. A compound of formula (1):



(I)

or a pharmaceutically acceptable salt thereof, where

R^1 and R^2 are the same or different and are C_{1-6}alkyl or with the nitrogen atom to which they are attached form a pyrrolidino or piperidino group;

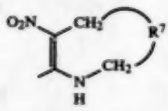
R^3 is C_{1-4} alkylene;

W is a group $-XYCH_2CH_2NHR^4$ in which

Y is methylene or sulphur;

X is methylene or oxygen, provided that it is methylene when Y is sulphur,

and R^4 is a group of formula (3):



where R^7 is a covalent bond or methylene or ethane-1, 2-diyl unsubstituted or substituted with one C_{1-6} alkyl group or a second C_{1-6} alkyl group or a phenyl (C_{1-6} alkyl) group.

4,894,373

ANTIESTROGENS AND THEIR USE IN TREATMENT OF MENOPAUSE AND OSTEOPOROSIS

Ronald L. Young, Houston, Tex., assignor to BCM Technologies, Inc., Houston, Tex.

Continuation-in-part of Ser. No. 660,510, Oct. 12, 1984, Pat. No. 4,729,999. This application Jan. 12, 1988, Ser. No. 143,081

Int. Cl.[4] A61K *31/535, 31/445, 31/40, 31/19*

U.S. Cl. 514—239.2 15 Claims

1. A method of treating and preventing bone tissue loss or osteoporosis in a patient, comprising administering a true antiestrogen selected from the group consisting of clomiphene, an isomer of clomiphene, a citrate of clomiphene, a derivative of clomiphene, tamoxifen, nafoxidine, CI-680, CI-628, CN-55,956-27, MER-25, U-11,555A, U-11,100A, ICI-46,669, ICI-46,474, diphenolhydrochrysene, erythro-MEA, Parke Davis CN-35,945, allenolic acid, cyclofenil, ethamoxytriphetol, and triparanol to said patient, without concomitant estrogen administration.

4,894,374

SUBSTITUTED 1,2-DIHYDRO-4H-3,1-BENZOXAZIN-4-ONE DERIVATIVES INHIBITORS OF INTERLEUKIN 1

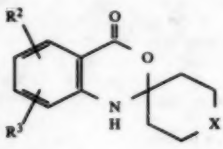
Jerauld S. Skotnicki, Chadds Ford, and Ahmed F. Abdel-Magid, Drexel Hill, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Filed Aug. 17, 1988, Ser. No. 233,186

Int. Cl.[4] H61K *31/535;* C07D *498/10*

U.S. Cl. 514—230.5 3 Claims

1. A method of treating immunoinflammatory, inflammatory/proliferative and enzymatic tissue destruction conditions which comprises administering to a mammal so afflicted an effective amount of a compound having the formula:



wherein

X is CHR, NR, S or O;

R is hydrogen, lower alkyl, lower alkenyl, or unsubstituted or substituted phenyl, naphthyl, pyridyl, quinolinyl, pyrazinyl, pyrimidinyl, quinoxalinyl or quinazolinyl, wherein the substituents are selected from halo, carboxy, lower alkoxycarbonyl, lower alkylsulfonyl, cyano, nitro and trifluoromethyl; and

R^2 and R^3 are each, independently, hydrogen, halo, lower alkyl, lower alkenyl, lower alkoxy, hydroxy, amino, mono- or diloweralkylamino, carboxy, lower alkoxycarbonyl, nitro or cyano.

4,894,375

METHOD OF CONTROLLING MYCOTIC INFECTIONS AND COMPOSITIONS THEREFOR

Hans H. Gadebusch, Yardley, Pa., and Mary E. Valiant, Plainfield, N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 913,044, Sep. 29, 1986, Pat. No. 4,782,059. This application Nov. 1, 1988, Ser. No. 265,449

Int. Cl.[4] A61K *31/50, 31/495, 31/135*

U.S. Cl. 514—249 8 Claims

1. A fungicidal composition in unit dosage form suitable for treating mycotic infections comprising a mycotic infection controlling amount in combination of:

(1) from about 200 to 400 milligrams of a compound having 14α-methyldemethylase inhibitor activity and named cis-1-acetyl-4-[4-[[2-(2,4-dichlorophenyl)-2-(1H-imidazol-1-ylmethyl)-1,3-dioxolan-4-yl]methoxy]phenyl]piperazine (ketoconazole), and

(2) from about 200 to 400 milligrams of a compound having squalene epoxidase inhibitor activity and named (E)-N-(6,6-dimethyl-2-hepten-4-ynyl-N-methyl-naphthalenemethylamine (terbinafine).

4,894,376

METHODS OF TREATING DISEASES CHARACTERIZED BY HYPEREXCITABILITY OF NEURONS

Martin Morad, Newtown Square, and Cha-Min Tang, Overbrook Hills, both of Pa., assignors to Trustees of the University of Pennsylvania, Philadelphia, Pa.

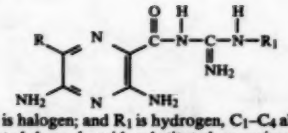
Filed Feb. 26, 1988, Ser. No. 160,835

Int. Cl.[4] A61K *31/495;* C07D *241/20*

U.S. Cl. 514—255 58 Claims

1. A method of regulating the excitability of neurons in a mammal comprising:

administering to said mammal a substituted pyrazinoylguanidine having the formula



wherein R is halogen; and R_1 is hydrogen, C_1–C_4 alkyl, benzyl or substituted benzyl; said substituted pyrazinoylguanidine being administered to said mammal in an amount sufficient to effect said regulation.

4,894,377

β-CARBOLINES AND THEIR USE AS MEDICINAL AGENTS

Dieter Seidelmann; Ralph Schmiechen; Andreas Huth; Dieter Rahtz, all of Berlin, Fed. Rep. of Germany; Claus T. Braestrup, Roskilde, and Mogens Engelstoft, Vaerlose, both of Denmark, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

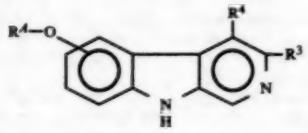
Continuation of Ser. No. 623,610, Jun. 22, 1984, abandoned. This application Jan. 14, 1987, Ser. No. 3,179

Claims priority, application Fed. Rep. of Germany, Jun. 23, 1983, 3322895

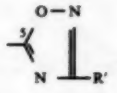
Int. Cl.[4] C07D *471/14;* A61K *31/40*

U.S. Cl. 514—292 **25 Claims**

1. A substituted β-carboline of the formula



wherein R^3 is a 5- oxadiazolyl group of the formula



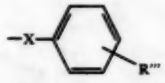
or —COOR", wherein R' is C_{1-3} alkyl or C_{3-6} cycloalkyl and

R" is C_{1-4} alkyl;

R^4 is hydrogen, methyl, ethyl or methoxymethyl; and

R^A is aryl of the formula

or aralkyl of the formula



wherein X is C_{1-12} is straight-chain, branched-chain, saturated or unsaturated alkyl or a corresponding alkyl group with a CH_2-group substituted by a carbonyl group and R"' is one or more of fluorine, chlorine, bromine, or iodine, C_{1-3} alkoxy, C_{1-5} alkanoyloxy, benzoyloxy, phenyl, C_{2-5} alkylenedioxy, trifluoromethyl, nitro or $-NR^{IV}R^{V}$ wherein R^{IV} and R^{V}, which can be the same or different, are hydrogen, C_{1-3} alkyl, C_{1-5} alkanoyl, benzoyl or phenyl, or collectively with the nitrogen atom form an ethyleneimino, 2'-methyl pyrrolidino, piperidino, morpholino, thiomorpholino or N-methyl-piperazino ring.

4,894,378

LOWERING BLOOD SUGAR WITH NOVEL 4-THIENYL-DIHYDROPYRIDINES

Siegfried Goldmann; Hilmar Bischoff; Walter Puls; Joachim Bender, all of Wuppertal; Dieter Petzinna, Wesel, and Klaus Schlossmann, Wuppertal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Levekusen, Fed. Rep. of Germany

Division of Ser. No. 937,870, Dec. 4, 1986, Pat. No. 4,801,715. This application Jun. 22, 1988, Ser. No. 210,061

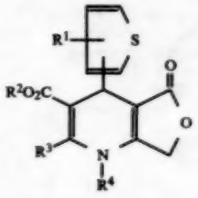
Claims priority, application Fed. Rep. of Germany, Dec. 18, 1985, 3544693

The portion of the term of this patent subsequent to Jan. 31, 2006, has been disclaimed.

Int. Cl.[4] A61K *31/44;* C07D *491/048*

U.S. Cl. 514—302 **7 Claims**

1. A 4-thienyl-dihydropyridine of the formula



in which

R^1 represents fluorine or chlorine, or represents straight-chain or branched alkyl with up to 4 carbon atoms,

R^2 represents a straight-chain, branched or cyclic hydrocarbon radical which has up to 8 carbon atoms, is optionally interrupted by an oxygen atom and is optionally substituted by one or more fluorine, chlorine, phenyl, hydroxyl, cyano, amino, C_1–C_3-alkylamino, di-C_1–C_3-alkylamino or N-benzyl-N-methyl-amino groups,

R^3 represents C_1–C_4-alkyl which is optionally substituted by hydroxyl and

R^4 represents methyl or straight-chain, branched or cyclic alkyl radical with 3 to 6 carbon atoms,

or a physiologically acceptable salt thereof.

4,894,379

FUNGICIDAL PYRIDYL IMIDATES

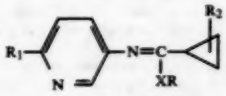
Don R. Baker, Orinda, and Keith H. Brownell, San Jose, both of Calif., assignors to ICI Americas Inc., Wilmington, Del.

Division of Ser. No. 36,543, Apr. 15, 1987, Pat. No. 4,767,771, which is a continuation-in-part of Ser. No. 944,170, Dec. 22, 1986, abandoned, which is a continuation of Ser. No. 859,153, May 2, 1986, abandoned. This application May 26, 1988, Ser. No. 198,906

Int. Cl.[4] C07D *401/12, 405/12;* A01N *43/40*

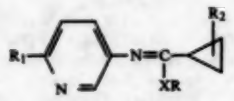
U.S. Cl. 514—332 **5 Claims**

1. A compound having the structural formula



wherein R is furfuryl or pyridyl, R_1 is selected from the group consisting of halogen, C_1–C_3 alkoxy and C_1–C_3 haloalkoxy, R_2 is hydrogen, and X is S or O; or a fungicidally acceptable organic or inorganic salt thereof.

4. The method of controlling fungi comprising applying to the area where control is desired, a fungicidally effective amount of a compound having the formula



wherein R is furfuryl or pyridyl,

R_1 is selected from the group consisting of halogen, C_1–C_3 alkoxy and C_1–C_3 haloalkoxy, R_2 is hydrogen, and X is S or O; or a fungicidally acceptable organic or inorganic salt thereof.

4,894,380

2-MERCAPTO-5-PYRIDYL-1,3,4-OXADIAZOLES AND 2-MERCAPTO-5-PYRIDYL-1,3,4-THIADIAZOLES OF THE FORMULA I

Robert Nyfeler, Basel, Switzerland; Wolfgang Eckhardt, Lörrach, Fed. Rep. of Germany; Ernst Beriger, Allschwil, and Odd Kristiansen, Möhlin, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

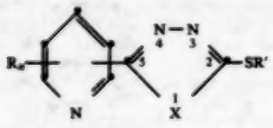
Filed Mar. 25, 1988, Ser. No. 176,483

Claims priority, application Switzerland, Apr. 3, 1987, 1293/87

Int. Cl.[4] C07D *413/04*; A61K *31/41*

U.S. Cl. 514—340 **24 Claims**

1. A 2-mercapto-5-pyridyl-1,3,4-oxadiazole or 2-mercapto-5-pyridyl-1,3,4-thiadiazole of the formula (I)



wherein

X is oxygen or sulfur,

R' is C_1–C_3alkyl which is substituted by bromine, fluorine, C_1–C_3alkoxy or cyano; unsubstituted or halogen-substituted C_3–C_7alkenyl; halogen-substituted C_4–C_7alkynyl,

R is C_1–C_3alkyl; or halo-C_1–C_3alkyl unsubstituted C_1–C_3alkoxy or C_1–C_3alkoxy which is substituted by halogen or C_1–C_3alkoxy; unsubstituted or halogen-substituted C_3–C_7alkenyl; C_3–C_7alkynyl, C_1–C_3alkylthio; halogen; cyano; hydroxy, amino or amino which is substituted by one or two C_1–C_3alkyl groups; or is aminocarbonyl; and

n is 0, 1, 2, 3 or 4,

or a salt thereof.

4,894,381

MICROBICIDAL (AZOLYL-VINYL)-PHENOL ALKENYL ETHERS

Gerold Schaše, Cologne; Wilhelm Brandes, Leichlingen, and Gerd Hänssler, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

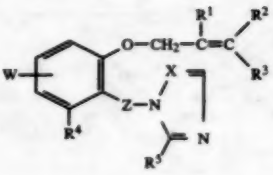
Filed Jun. 9, 1988, Ser. No. 204,471

Claims priority, application Fed. Rep. of Germany, Jun. 27, 1987, 3721336; Apr. 15, 1988, 3812483

Int. Cl.[4] A01N *43/653*, *43, 50*; C07D *233/60*

U.S. Cl. 514—383 **7 Claims**

1. An (azolyl-vinyl)-phenol alkenyl ether, or acid or metal salt addition product thereof, of the formula



(I)

in which

R^1 represents hydrogen, fluorine, chlorine, bromine or alkyl with 1 to 4 carbon atoms,

R^2 represents hydrogen, fluorine, chlorine, bromine, alkyl with 1 to 4 carbon atoms, or alkenyl with 2 to 4 carbon atoms optionally substituted by optionally substituted aryl, or represents phenyl which is optionally substituted by one to three identical or different substituents from the group consisting of alkyl with 1 to 4 carbon atoms, halogen and/or halogenoalkyl with 1 or 2 carbon atoms and 1 to 5 halogen atoms, or

R^1 and R^2 together represent a C—C bond, thus forming an alkine bond between the carbon atoms which carry the,

R^3 represents hydrogen, fluorine, chlorine, bromine, iodine or alkyl with 1 to 12 carbon atoms, or represents phenyl which is optionally substituted by one to three identical or different substituents from the group consisting of alkyl with 1 to 4 carbon atoms, halogen and/or halogenoalkyl with 1 or 2 carbon atoms and 1 to 5 halogen atoms,

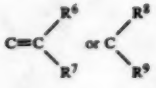
R^4 represents hydrogen,

R^5 represents hydrogen or alkyl with 1 to 4 carbon atoms,

W represents hydrogen, fluorine, chlorine or bromine,

X represents nitrogen or a CH group and

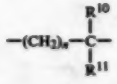
Z represents the groupings



wherein

R^6 represents phenyl which is optionally substituted by one to three identical or different substituents from the group consisting of alkyl with 1 to 4 carbon atoms, halogen and/or halogenoalkyl with 1 or 2 carbon atoms and 1 to 5 halogen atoms, or

R^6, together with R^4, represents the grouping



R^7 represents hydrogen or alkyl with 1 to 4 carbon atoms,

R^8 represents hydrogen or alkyl with 1 to 4 carbon atoms,

R^9 represents hydrogen or alkyl with 1 to 4 carbon atoms,

R^{10} represents hydrogen or alkyl with 1 to 4 carbon atoms,

R^{11} represents hydrogen or alkyl with 1 to 4 carbon atoms and

n represents the number 0, 1 or 2.

6. A method of combating microbes which comprises applying to such microbes or to a locus from which it is desired to exclude such microbes a microbicidally effective amount of a compound or addition product thereof according to claim 1.

4,894,382

SUBSTITUTED 1,3-DIAZOLYL-2-PROPANOLS AND THEIR USE AS ANTIMYCOTIC AGENTS

Hans-Ludwig Elbe; Graham Holmwood; Erik Regel, all of Wuppertal; Karl H. Büchel, Burscheid; Klaus Schaller, Wuppertal, and Manfred Piempel, Haan, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

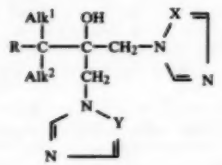
Continuation of Ser. No. 578,237, Feb. 8, 1984, abandoned. This application Oct. 29, 1986, Ser. No. 924,658

Claims priority, application Fed. Rep. of Germany, Mar. 2, 1983, 3307217

Int. Cl.[4] A61K *31/415, 31/41;* C07D *249/08, 403/06*

U.S. Cl. 514—383 16 Claims

1. A substituted 1,3,-diazolyl-2-propanol of the formula



(I)

in which

Alk^1 represents straight-chain or branched alkyl with 1 to 4 carbon atoms; and

Alk^2 represents straight-chain or branched alkyl with 1 to 4 carbon atoms; or

Alk^1 and Alk^2 together represent a 3-membered to 7-membered cycloaliphatic ring,

X represents a nitrogen atom or the CH group;

Y represents a nitrogen atom or the CH group; and

R represents phenyl, phenylalkyl with 1 to 4 carbon atoms in the alkyl part, phenoxy, phenylthio, phenoxyalkyl with 1 to 4 carbon atoms in the alkyl part, phenylthioalkyl with 1 to 4 carbon atoms in the alkyl part, benzyloxy or benzylthio, each of which is optionally mono-, di- or tri-substituted in the phenyl part by identical or different substituents selected from the group consisting of halogen, alkyl with 1 to 4 carbon atoms, alkoxy and alkylthio with in each case 1 to 4 carbon atoms, halogenoalkyl, halogenoalkoxy and halogenoalkylthio with in each case 1 or 2 carbon atoms and 1 to 5 identical or different halogen atoms, nitro, cyano, hydroxyl, hydroxycarbonyl, alkoxycarbonyl with 1 to 4 carbon atoms in the alkyl part, hydroximinoalkyl with 1 to 4 carbon atoms in the alkyl part, alkoximinoalkyl with 1 to 4 carbon atoms in each alkyl part, and phenyl, phenoxy, benzyl and benzyloxy, each of which is optionally substituted by halogen and/or alkyl with 1 or 2 carbon atoms,

or a physiologically acceptable acid addition salt thereof.

4,894,383

FUNGICIDAL HYDROXYALKYL-TRIAZOLYL DERIVATIVES

Graham Holmwood, Wuppertal; Udo Kraatz, Leverkusen; Karl H. Büchel, Burscheid; Wilhelm Brandes, Leichlingen; Stefan Dutzmann, Duesseldorf, and Paul Reinecke, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

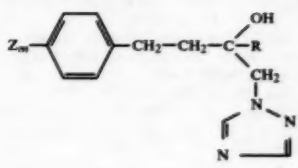
Filed May 5, 1988, Ser. No. 190,733

Claims priority, application Fed. Rep. of Germany, May 18, 1987, 3716559

Int. Cl.[4] A01N *43/653;* C07D *249/08*

U.S. Cl. 514—383 9 Claims

1. A hydroxyalkyl-triazolyl derivative of the formula

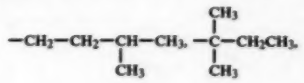


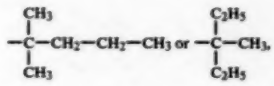
(I)

in which

R represents a radical of the formula $—CH_2—CH(CH_3)_2$,

$—(CH_2)_4—CH_3$, $—(CH_2)_5—CH_3$, $—(CH_2)_6—CH_3$,





Z represents fluorine, chlorine, methyl, trifluoromethoxy or methoximinomethyl, and

m represents 0 or 1,

or an addition product thereof with an acid or metal salt.

4,894,384

ALPHA-(1-TRIAZOLYL)-KETO-DERIVATIVES HAVING FUNGICIDAL ACTIVITY

Mirella Cecere; Franco Gozzo; Antonio Malandra, and Luigi Mirenna, all of Milan, Italy, assignors to Montedison S.p.A., Milan, Italy

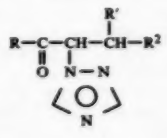
Continuation-in-part of Ser. No. 913,314, Sep. 30, 1986, abandoned, which is a continuation of Ser. No. 556,336, Nov. 30, 1983, abandoned, which is a continuation-in-part of Ser. No. 500,360, Jun. 2, 1983, abandoned. This application Feb. 29, 1988, Ser. No. 165,382

Claims priority, application Italy, Jun. 3, 1982, 21665 A/82; Dec. 30, 1982, 25048 A/82

Int. Cl.[4] A01N *43/653;* C07D *249/08*

U.S. Cl. 514—383 4 Claims

1. A compound of formula



in which:

R is selected from the group consisting of phenyl, phenyl substituted by at least one group selected from C_1–C_4 alkyl, C_1–C_4 alkoxy, and halogen atoms;

R′ is selected from the group consisting of phenyl, C_1–C_4 alkyl, —COOR substituted by C_1–C_4 alkyl; and

R^2 is a phenyl carbonyl group, a phenyl carbonyl group in which the phenyl is substituted by at least one substituent selected from the group consisting of C_1–C_4 alkyl, C_1–C_4 alkoxy and halogen atoms.

4,894,385

IMIDAZOLE DERIVATIVES AS INHIBITORS OF TXA_2 SYNTHESIS

Isao Kawamoto; Rokuro Endo; Keiichi Matsuda; Shigeru Ushiyama, and Takeshi Oshima, all of Tokyo, Japan, assignors to Sankyo Company Limited, Tokyo, Japan

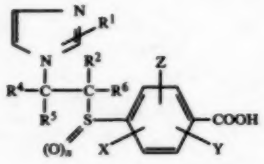
Filed Jan. 14, 1986, Ser. No. 818,873

Claims priority, application Japan, Jan. 16, 1985, 60-4055

Int. Cl.[4] A61K *31/415;* **C07D** *405/06, 409/06*

U.S. Cl. 514—397 **34 Claims**

28. A method for the treatment or prophylaxis of diseases and disorders arising from an imbalance in the level of TXA_2 in an animal, which comprises administering to said animal an effective amount of an inhibitor of the synthesis of TXA_2, wherein said inhibitor is selected from the group consisting of compounds of formula (I):



(I)

wherein:

R^1 represents a hydrogen atom or a methyl group;

R^2 represents a hydrogen atom, a C_1–C_6 alkyl group, a C_2–C_6 alkenyl group, a C_2–C_6 alkynyl group, a C_3–C_8 cycloalkyl group, a C_3–C_8 cycloalkyl group having at least one substituent selected from C_1–C_6 alkyl groups, an aryl group, a heterocyclic group or a carboxy group, or one of said alkyl, alkenyl and alkynyl groups having at least one substituent selected from the group consisting of:

(a) C_1–C_4 alkoxy groups, C_1–C_6 alkanoyloxy groups, C_1–C_6 alkanoyl groups, carboxy groups, C_2–C_7 alkoxycarbonyl groups, C_2–C_7 alkoxycarbonyloxy groups, carbamoyloxy groups, alkylcarbamoyloxy groups in which the alkyl part is C_1–C_4 alkyl, dialkylcarbamoyloxy groups in which each alkyl part is C_1–C_4 alkyl, carbamoyl groups, alkylcarbamoyl groups in which the alkyl part is C_1–C_4 alkyl, dialkylcarbamoyl groups in which each alkyl part is C_1–C_4 alkyl, hydroxy groups, carboxylic acylamino groups, C_1–C_6 alkylthio groups, nitro groups, cyano groups, amino groups, C_1–C_6 haloalkyl groups, halogen atoms, C_1–C_6 alkylsulfinyl groups, C_1–C_6 alkylsulfonyl groups, aryl groups, heterocyclic groups C_3–C_8 cycloalkyl groups, and C_3–C_8 cycloalkyl groups having at least one substituent selected from C_1–C_6 alkyl groups;

R^4 represents a hydrogen atom, a C_1–C_6 alkyl group, a C_2–C_6 alkenyl group, a C_2–C_6 alkynyl group, an aryl group or an aromatic heterocyclic group, or said alkyl, alkenyl or alkynyl group having at least one substituent selected from the group consisting of:

C_1–C_6 alkoxy groups, C_1–C_6 haloalkyl groups, halogen atoms, aryl groups and aromatic heterocyclic groups;

R^5 and R^6 are independently selected from the group consisting of hydrogen atoms, C_1–C_6 alkyl groups, C_2–C_6 alkenyl groups and C_2–C_6 alkynyl groups;

X, Y and Z are independently selected from the group consisting of hydrogen atoms, C_1–C_6 alkyl groups, C_1–C_6 alkoxy groups, C_1–C_6 alkanoyloxy groups, hydroxy groups, C_1–C_6 alkylthio groups, cyano groups, amino groups, halogen atoms, C_1–C_6 alkylsulfinyl groups and C_1–C_6 alkylsulfonyl groups;

n is 0, 1 or 2

said aryl groups are C_6–C_{14} carbocyclic aryl groups which are unsubstituted or have at least one substituent selected from the group consisting of C_1–C_6 alkyl groups and substituents (a) other than said aryl groups; and

said aromatic heterocyclic groups are selected from the group consisting of

2-furyl, 3-furyl, 2-thienyl, 3-thienyl, 2-thiazolyl, 4-thiazolyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, 2-pyrazinyl, 2-pyrrolyl, 1-methyl-2-pyrrolyl, 1-imidazolyl, 1,2,4-triazol-1-yl and 2-pyrimidyl;

said heterocyclic groups are selected from the group consisting of

2-furyl, 3-furyl, 2-thienyl, 3-thienyl, 2-thiazoyl, 4-thiazolyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, 2-pyrazinyl, 2-pyrrolyl, 1-methyl-2-pyrrolyl, 1-imidazolyl, 1,2,4-triazol-1-yl and 2-pyrimidyl; and 2-tetrahydrofuryl, 2-tetrahydropyranyl, 2-pyrrolidinyl, 1-pyrrolidinyl, piperidino, 2-piperidiyl, 3-piperidyl, 4-piperidyl, 4-thiazolidinyl, 1-piperazinyl, 4-acetyl-1-piperazinyl, 4-formyl-1-piperazinyl, morpholino and thiomorpholino;

said heterocyclic groups and said aromatic heterocyclic groups being unsubstituted or having at least one substituent selected from the group consisting of C_1–C_6 alkyl groups and substituents (a) other than said heterocyclic groups;

provided that when both R^2 and R^6 are individually selected from the group consisting of hydrogen and alkyl, then at least one of R^4 and R^5 is not selected from the group consisting of hydrogen, unsubstituted alkyl and unsubstituted alkenyl;

or a pharmaceutically acceptable ester, amide or salt thereof.

4,894,386

ALIPHATIC CARBOXAMIDES

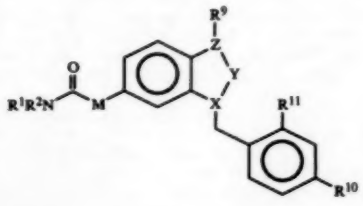
Frederick J. Brown, Crewe, England, and Victor G. Matassa, Chadds Ford, Pa., assignors to ICI Americas Inc., Wilmington, Del.

Continuation-in-part of Ser. No. 181,455, Apr. 14, 1988, abandoned, which is a continuation-in-part of Ser. No. 103,490, Oct. 1, 1987, abandoned, which is a continuation-in-part of Ser. No. 38,853, Apr. 15, 1987, abandoned. This application Oct. 11, 1988, Ser. No. 255,914

Int. Cl.[4] C07D *209/22, 209, 24;* **A61K** *31/405*

U.S. Cl. 514—414 **14 Claims**

1. A compound of formula I



I

wherein:

the group >Z—Y—X< is selected from a group consisting of:

(a) >C=CH—< and

(b) >N—CH=C<;

in which ">" indicates two separate bonds;

the groups R^1 and R^2 are each selected from the following groups:

(a) R^1 is hydrogen or (1-3C)alkyl and R^2 is selected from a group consisting of (1-10C)alkyl which may contain 1 or 2 double or triple bonds, (1-10C)heteroalkyl containing an oxygen or sulfur atom, (3-7C)cycloalkyl which may be substituted by 1 or 2 (1-3C)alkyl groups, (3-7C)cycloalkyl(1-4C)alkyl which may be substituted on the cycloalkyl portion 1 or 2 (1-3C)alkyl groups, phenyl which may be substituted by a member selected from a group consisting of (1-3C)alkyl, (1-3C)alkoxy, fluoro, bromo, chloro and iodo, and phenyl(1-4C)alkyl which may be substituted on the phenyl by a member selected from a group consisting

of (1-3C)alkyl, (1-3C)alkoxy, fluoro, bromo, chloro and iodo;

(b) R^1 and R^2 are each independently selected from a group consisting of hydrogen, (1-6C)alkyl, (2-4C)alkenyl, (2-4C)alkynyl, (3-7C)cycloalkyl and (3-7C)cycloalkyl(1-4C)alkyl; and

(c) R^1 and R^2 together with the nitrogen atom to which they are attached form a ring selected from a group consisting of azetidino, pyyrolidino, morpholino, thiomorpholino, piperidino and piperazino and wherein any of said rings may be substituted by 1 or 2 (1-3C)alkyl groups;

M is selected from a group consisting of CH_2, $C(R^5)(R^6)CH_2$, $C(R^5)=CH$, $C(R^5)(R^6)CH_2CH_2$, $C(R^5)(R^6)CH=CH$, $C(R^5)(R^6)CH_2CH_2CH_2$ and $C(R^5)(R^6)CH_2CH=CH$, wherein (a) R^5 and R^6 are each, independently, hydrogen or methyl, or (b) R^5 is hydrogen and R^6 is ethyl, propyl or isopropyl;

R^9 is selected from a group consisting of hydrogen, (1-10C)alkyl which may contain 1 or 2 double or triple bonds wherein said group may be substituted by a member selected from CO_2H, (1-4C)alkoxycarbonyl and $CONR^7R^8$ where R^7 is hydrogen or (1-6C)alkyl, and R^8 is hydrogen, (1-6C)alkyl, (3-6C)cycloalkyl, (3-6C)cycloalkyl(1-3C)alkyl, phenyl (which may be substituted by a member selected from a group consisting of (1-3C)alkyl, (1-3)alkoxy and halogeno), or phenyl(1-3C)alkyl, or R^7 and R^8, together with the nitrogen to which they are attached, form a ring selected from a group consisting of morpholino, N-propylpiperazino, pyrrolidino, 4,4-dimethylpiperidino, piperidono, thiomorpholino and piperazino and wherein any of said rings formed by R^7 and R^8 may be substituted by 1 or 2 (1-3C)alkyl groups; or R^9 is (3-6C)cycloalkyl, (3-6C)cycloalkyl(1-4C)alkyl or $CONR^7R^8$;

R^{10} is selected from a group consisting of CO_2H, $CONHSO_2R^{12}$, 1H-tetrazol-5-yl and $COCH_2SO_2R^{12}$;

R^{11} is selected from hydrogen, (1-4C)alkoxy, (1-2C)alkyl and hydroxy;

R^{12} is selected from a group consisting of (6-12C)aryl, pyridyl, and (6-12C)aryl(1-4C)alkyl, in any of which the aromatic or pyridyl moiety may bear 1 or 2 substitutents selected from a group consisting of halogeno, (1-4C) alkyl, (1-4C)alkoxy, trifluoromethyl, nitro and amino;

or salts thereof, including pharmaceutically acceptable salts.

12. A method of antagonizing the action of at least one type of leukotriene in a mammal requiring such treatment comprising administering to said mammal an effective amount of a compound of claim 1.

4,894,387

5-SUBSTITUTED-3-AMINOALKYL INDOLE DERIVATIVES

Darko Butina, Arlesey; Michael D. Dowle, Ware, and Ian H. Coates, Pertford, all of England, assignors to Glaxo Group Limited, London, England

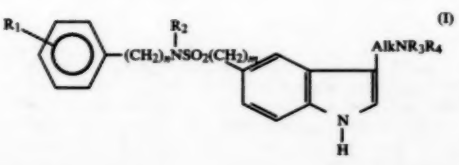
Continuation of Ser. No. 679,029, Dec. 6, 1984, abandoned. This application Mar. 26, 1987, Ser. No. 30,235

Claims priority, application United Kingdom, Dec. 6, 1983, 8332437

Int. Cl.[4] A61K *31/40*; C07D *209/14*

U.S. Cl. 514—415 **9 Claims**

1. A compound of formula:



wherein

R_1 which may be in the ortho, meta or para position, represents a halogen atom, C_{1-3}alkyl, C_{1-3}alkoxy, hydroxy, a group NR_aR_b or $CONR_aR_b$, where R_a and R_b, which may be the same or different, each represents a hydrogen atom, C_{1-3} alkyl, C_{3-4}alkenyl;

R_2 represents a hydrogen atom or a C_{1-3}alkyl group;

R_3 and R_4, which may be the same or different, each represents a hydrogen atom, C_{1-3}alkyl, propenyl or R_3 and R_4 together form a benzylidene group; Alk represents an alkylene chain containing two or three carbon atoms which may be unsubstituted or substituted by not more than two C_{1-3}alkyl groups; and

n and m which may be the same or different, each represents an integer from 1 to 4 or n may be zero;

and physiologically acceptable salts and hydrate thereof.

9. A method for the treatment of pain resulting from dilatation of the cranial vasculature which comprises administering to a patient an effective amount of a compound as claimed in claim 1 to relieve said pain.

4,894,388

GLYCOSIDASE INHIBITORS AND USE THEREOF

George W. J. Fleet, Oxford, United Kingdom, assignor to Monsanto Company, St. Louis, Mo.

Filed Dec. 22, 1988, Ser. No. 288,735

Int. Cl.[4] C07D *207/12*; A61K *31/40*

U.S. Cl. 574—425 **7 Claims**

1. A compound selected from the group consisting of 1,4-dideoxy-1,4-imino-L-allitol and its N-substituted alkyl and benzyl derivatives and the pharmaceutically acceptable acid salts thereof in which the alkyl group contains from one to six carbon atoms.

6. The method of substantially changing the specificity of glycosidase inhibitory activity of 1,4-dideoxy-1,4-imino-L-allitol or its HCl salt consisting essentially of substituting the ring nitrogen with an alkyl substituent in which the alkyl group contains from one to six carbon atoms.

7. The method of substantially changing the specificity of glycosidase inhibitory activity of 1,4-dideoxy-1,4-imino-L-allitol or its HCl salt from predominantly an inhibitor of α-D-mannosidase to one that selectively inhibits α-L-fucosidase consisting essentially of substituting the ring nitrogen with a benzyl group.

4,894,389

NOVEL AMINOALKYL-SUBSTITUTED HETEROCYCLIC SULFUR COMPOUNDS

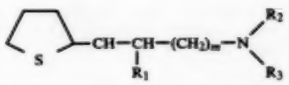
Thomas M. Bargar, Clayton, Calif.; Robert J. Borersma, Noblesville, and Lawrence C. Creemer, Indianapolis, both of Ind., assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio

Filed Oct. 2, 1987, Ser. No. 104,195

Int. Cl.[4] A61K *31/38*; C07D *333/12*

U.S. Cl. 514—438 **6 Claims**

1. A compound of the formula



wherein

m is an integer of from 0 to 4, with the proviso that when m is 0, one of R_1, R_2, or R_3 must be other than hydrogen,

R_1 is hydrogen or lower alkyl of from 1 to 6 carbon atoms,

R_2 is hydrogen, lower alkyl of from 1 to 6 carbon atoms, hydroxy, amino or amidino, and

R_3 is hydrogen or lower alkyl of from 1 to 6 carbon atoms, and the therapeutically acceptable acid addition salts thereof.

4,894,390

SUBSTITUTED THIENO[2,3-b]THIOPHENE-2-SULFONAMIDES AS ANTIGLAUCOMA AGENTS

George D. Hartman, Lansdale, and John D. Prugh, Chalfont, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 191,085, May 4, 1988, which is a continuation-in-part of Ser. No. 162,532, Mar. 1, 1988, abandoned, and a continuation-in-part of Ser. No. 80,851, Aug. 3, 1987, abandoned. This application Oct. 21, 1988, Ser. No. 260,632

The portion of the term of this patent subsequent to Feb. 21, 2006, has been disclaimed.

Int. Cl.[4] A61K *31/38;* **C07D** *333/32*

U.S. Cl. 514—443 **3 Claims**

1. 5-[N-Methoxyethyl-N-methoxyethoxyethyl)aminomethyl]thieno[2,3-b]thiophene-2-sulfonamide.

4,894,391

NOVEL PROSTACYCLIN DERIVATIVES, PROCESS FOR THE PREPARATION THEREOF, AND USE THEREOF AS MEDICINAL AGENTS

Werner Skuballa; Helmut Dahl; Bernd Radüchel; Helmut Vorbrüggen, and Olaf Loge, all of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

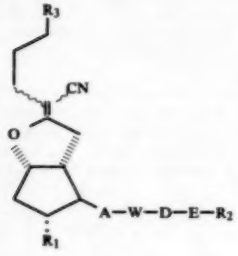
Filed Jun. 25, 1984, Ser. No. 623,869

Claims priority, application Fed. Rep. of Germany, Jun. 23, 1983, 3322893

Int. Cl.[4] A61K *31/34;* **C07D** *307/395*

U.S. Cl. 514—452 **21 Claims**

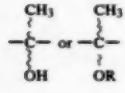
1. A 5-cyanoprostacyclin of the formula



wherein

A is a $—CH_2—CH_2—$, trans-CH=CH—, or —C≡C—;

W is hydroxymethylene, RO-methylene, or

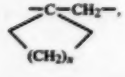


wherein the OH- or OR-group can be in the α- or β-position;

R is tetrahydropyranyl, tetrahydrofuranyl, α-ethoxyethyl, trimethylsilyl, dimethyl-tert-butylsilyl, tribenzylsilyl or an acyl group of a C_{1-15}-hydrocarbon carboxylic or sulfonic acid;

D and E together are a direct bond, or

D is



a straight-chain-C_{1-5}-alkylene group or a branched- or straight-chain, -alkylene, -alkenylene or group of 2–5 carbon atoms, or one of these groups substituted by fluorine and

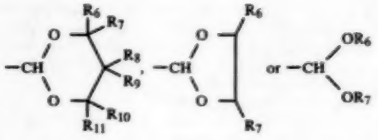
E is oxygen, sulfur, —C≡C—, a direct bond, or $—CR_4=C-R_5—$ wherein R_4 and R_5 are different and each is hydrogen, halogen or alkyl of 1–4 carbon atoms;

n is 1, 2, or 3;

R_2 is (a) C_{1-10} alkyl or alkenyl; (b) C_{1-10} alkyl or alkenyl, each substituted by C_{6-10} aryl or by C_{6-10} aryl substituted by 1–3 halogen atoms, a phenyl group, 1–3 C_{1-4} alkyl groups or a chloromethyl, fluoromethyl, trifluoromethyl, carboxy, hydroxy or C_{1-4} alkoxy group; (c) C_{3-10} cycloalkyl, (d) C_{3-10} cycloalkyl substituted by C_{1-4} alkyl, (e) C_{6-10} aryl, (f) C_{6-10} aryl substituted by 1–3 halogen atoms, a phenyl group, 1–3 C_{1-4} alkyl groups or a chloromethyl, fluoromethyl, trifluoromethyl, carboxy, hydroxy or C_{1-4} alkoxy group; or (h) an aromatic heterocycle of 5 or 6 ring atoms one of which is O, N or S, the remainder being carbon atoms;

R_1 is OH or OR; and

R_3 is



wherein R_6, R_7, R_8, R_9, R_{10}, and R_{11} can be identical or different and each is hydrogen, C_{1-5}-alkyl, C_{6-10} aryl, or C_{6-10} aryl substituted by 1–3 halogen atoms, a phenyl group, 1–3 C_{1-4} alkyl groups or a chloromethyl, fluoromethyl, trifluoromethyl, carboxy, hydroxy or C_{1-4} alkoxy group.

4,894,392

AMINOALKYL NAPHTHALENEDIOLS AS HOST RESISTANCE ENHANCERS

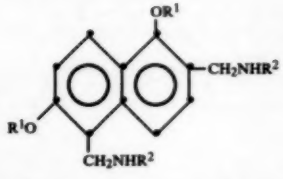
Philippe L. Durette, New Providence, N.J., and Timothy F. Gallagher, Harleysville, Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 90,403, Aug. 27, 1987, abandoned, which is a continuation of Ser. No. 803,036, Nov. 29, 1985, abandoned. This application May 12, 1988, Ser. No. 195,353

Int. Cl.[4] A61K *31/35, 31/34, 31/135*

U.S. Cl. 514—459 **4 Claims**

1. A method of enhancing host resistance against bacterial or fungal infection comprising adminstering to said host a compound of the formula:



where R^1 is independently selected from H, C_1–C_6alkyl; R2 is independently selected from the group consisting of: 1-adamantylmethyl, 2-adamantylmethyl; 3-methyl-1-adamantylmethyl, 3-methyl-2-adamantylmethyl, 3,5-dimethyl-1-adamantylmethyl, 3-ethyl-1-adamantylmethyl, 3-propyl-1-adamantylmetyl, 3-methoxy-1-adamantylmethyl, 3-ethoxy-1-adamantylmethyl, cyclohexylmethyl-, 2-, 3-, 4-trimethyl-cyclohexylmethyl-, 2,4-dimethylcyclohexylmethyl-, 2-methoxycyclohexylmethyl-, 4-t-butoxycyclohexylmethyl-, 3-isopropoxycy-

clohexylmethyl-, tetrahydropyranyl-4-methyl, 2-methyletrahydropyranyl-4-methyl, 2,5-dimethoxytetrahydropyranyl-4-methyl, cyclopentylmethyl, methylcyclopentylmethyl tetrahydrosufyl unsubstituted or C1–C4 alkyl or alkoxy substituted monocycloalkyl, di- or tri- cycloalkyl, or heterocycloalkyl containing one oxygen hereto atom, and pharmaceutically acceptable acid addition salts thereof; in a physiologicaly acceptable mediu in an amount effective to impart resistance against bacterial or fungal infection.

4,894,393

DITHIOCARBAMATE-CHOLINE ADDUTS AND USE THEREOF IN TREATMENT OF BRAIN DISEASES

Dat-Xuong Nguyen, Antony; Jean Rapin, Paris, and Thadée Staron, Noisy le Roi, all of France, assignors to Lafon Pharma S.A., Fribourg, Switzerland

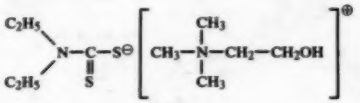
Filed Sep. 16, 1988, Ser. No. 245,243

Claims priority, application France, Sep. 18, 1987, 87 12968

Int. Cl.[4] C07C *155/06*; A61K *31/27*

U.S. Cl. 514—476 **7 Claims**

1. Choline diethyl-dithio-carbamate having the formula:



7. Process for the treatment of degenerative brain diseases of the class consisting of senile dementia, Alzheimer's Disease and dementias of the Alzheimer type, which comprises administering to a human in need thereof an effective amount of choline diethyl-dithio-carbamate.

4,894,394

PROCESS FOR THE MANUFACTURE OF METHANOL IN COMBINATION WITH STEAM REFORMING OF LIGHT HYDROCARBONS

Arjan Van Dijk, and Swan T. Sie, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Oct. 12, 1988, Ser. No. 256,522

Claims priority, application United Kingdom, Nov. 27, 1987, 8727774

Int. Cl.[4] C07C *27/06*

U.S. Cl. 518—700 **7 Claims**

1. Process for the production of methanol which comprises:

(a) reacting a mixture of steam, carbon dioxide and light hydrocarbons at a pressure from 20–30 bar in a reforming zone heated by the oxidation of carbonaceous fuel to obtain steam reformate containing hydrogen and carbon monoxide in a molar ratio of hydrogen to carbon monoxide in the range from 2.8 to 4.5;

(b) passing said steam reformate to a carbon dioxide separation zone to obtain a carbon dioxide steam and a treated stream reformate stream having substantially less carbon dioxide than said feed to step (b);

(c) recycling at least part of said carbon dioxide stream from step (b) as feed to step (a);

(d) reacting said treated stream reformate from step (b) in a single pass through a reaction zone at a temperature in the range from 70°–140° C. and a pressure from 15–25 bar in the presence of a catalyst system resulting from combining

(1) a nickel salt;

(2) an alcoholate of an alkali or an alkaline earth metal, and at least one of the following components:

(3) a hydride of an alkali metal or an alkaline earth metal, or

(4) an alcohol or an in-situ alcohol providing agent to obtain a reaction product containing methanol formed in the liquid phase, carbon monoxide and a mixture of other gases;

(e) partially condensing said reaction product from step (d) to obtain a methanol product stream and an uncondensed off-gas stream; and

(f) passing said uncondensed off-gas stream as fuel to heat the reforming zone of step (a).

4,894,395

EXPANDABLE POLYOLEFIN COMPOSITIONS AND POLYOLEFIN FOAM PREPARATION PROCESS

Chung P. Park, Pickerington, Ohio, assignor to The Dow Chemical Company, Midland, Mich.

PCT No. PCT/US87/00139, § 371 Date Sep. 21, 1987, § 102(e) Date Sep. 21, 1987, PCT Pub. No. WO87/04445, PCT Pub. Date Jul. 30, 1987

PCT Filed Jan. 21, 1987, Ser. No. 138,907

Int. Cl.[4] C08J *9/14*

U.S. Cl. 521—79 **15 Claims**

1. A process for preparing closed-cell olefin polymer foamed articles which comprises:

(a) heat plastifying a normally solid olefin polymer

(b) admixing said heat plastified resin under elevated temperature and pressure with

(1) a stability control agent which functions to control the dimensional stability of the foam during the curing period, and

(2) a mixed blowing agent selected from the group consisting of:

(i) a mixture comprising 1,2-dichlorotetrafluoroethane, from about 60 to about 95 weight percent, and from about 5 to about 50 weight percent of ethyl chloride or trichloro-fluoromethane and

(ii) a mixture which comprises from about 5 to about 85 weight percent of 1,2-dichlorotetrafluoroethane, from about 5 to about 85 percent of dichlorodifluoromethane and from about 5 to about 50 weight percent of a aliphatic hydrocarbon, a halogenated hydrocarbon compound physical blowing agent or mixture thereof having an atmospheric pressure boiling point ranging from about 0° C. to about 50° C., and

(c) extruding the resultant mixture into a zone of lower temperature and pressure to thereby form said olefin polymer foam, wherein the foam produced thereby does not shrink to less than about 80 percent of its initial volume at 65° C. for a prolonged period of time.

4,894,396

IMPRESSION MATERIAL

Robert G. Fisher, Beckenham, England, assignor to ESPE Stiftung & Co. Produktions- und Vertriebs-KG, Seefeld, Fed. Rep. of Germany

Continuation of Ser. No. 40,806, Apr. 21, 1987, abandoned. This application Jun. 21, 1988, Ser. No. 211,122

Claims priority, application United Kingdom, Apr. 23, 1986, 8609851

Int. Cl.[4] A61K *6/10*; A61C *9/00*

U.S. Cl. 523—109 **11 Claims**

1. A two part impression material comprising a first part comprising a product of the reaction of an alpha, beta-ethylenically unsaturated dicarboxylic acid anhydride and a liquid polydiene resin and a second part comprising a setting agent for the reaction product which setting agent is an alkoxylated fatty monoamine or an alkoxylated fatty polyamine having from 2 to 30 moles of alkoxylate per mole of the fatty amine, the alkoxylate groups being one or more alkoxylates selected from the group comprising ethoxylate, propoxylate and butoxylate, the impression material being characterized in that the first part and/or the second part also comprises an organic liquid which, when blended into the first part and/or second part of the impression material, forms a relatively stable emulsion in which the organic liquid is the dispersed phase and the reaction product or the setting agent is the continuous phase.

4,894,397

STABLE EMULSION POLYMERS AND METHODS OF PREPARING SAME

Lee W. Morgan, Racine; Richard J. Esser, Nieuwkoop, and Dennis P. Jensen, Burlington, all of Wis., assignors to S. C. Johnson & Son, Inc., Racine, Wis.

Filed Apr. 21, 1988, Ser. No. 184,480

Int. Cl.[4] C08F *9/00, 265/04*; C08G *9/00*; B32B *3/10*

U.S. Cl. 523—201 **18 Claims**

1. In a process for producing a latex, which comprises the steps of:

(a) reacting latex-forming monomers under predetermined emulsion-polymerization reaction conditions to form a hydrophilic, first-stage polymer; and

(b) contacting the first-stage polymer with an effective amount of at least one hydrophobic, latex-forming monomer under predetermined emulsion-polymerization reaction conditions to form a hydrophobic, second-stage polymer, wherein the second-stage hydrophobic polymer partitions into the first-stage hydrophilic polymer thereby producing an inverted core-shell emulsion polymer,

wherein the improvement comprises the additional step of adjusting the pH of the inverted core-shell emulsion polymer by an amount effective to dissolve the first-stage hydrophilic polymer, the first-stage hydrophilic polymer being dissolvable and the second-stage hydrophobic polymer being insoluble upon adjustment of pH, for thereby producing a stabilized latex comprising a continuous aqueous phase containing the first-stage hydrophilic polymer and a discontinuous phase containing discrete, stabilized particles of the second-stage hydrophobic polymer.

4,894,398

METHOD FOR STABILIZING UNSATURATED ORGANOSILICONE COMPOSITIONS

Howard M. Bank, Freeland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Division of Ser. No. 120,256, Nov. 13, 1987, Pat. No. 4,798,889. This application Sep. 19, 1988, Ser. No. 246,234

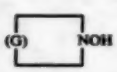
Int. Cl.[4] C08K *5/46*

U.S. Cl. 524—83 **19 Claims**

1. A method for stabilizing an organosilicone selected from organopolysiloxanes having a reactive organic group bearing at least one radical selected from the group consisting of acryloxy, methacryloxy, acrylamide, methacrylamide, styryl and vinylbenzyl radicals, said method comprising adding to said organosilicone a stabilizing amount of a hydroxylamine compound selected from the group consisting of those having the general formula

$$Q_2NOH$$

in which Q independently denotes an alkyl radical having 1 to 12 carbon atoms, a cycloalkyl group having 5 to 12 carbon atoms or an aryl group having 6 to 9 carbon atoms, and those having the formula



in which G denotes a hydrocarbyl group having 5 to 11 carbon atoms.

4,894,399

LIGHT-STABILIZED POLYMER MICROPARTICLES CONTAINING EPOXY GROUPS

Jean Rody, Rieben; Mario Slongo, Tafers; Franciszek Sitek, Therwil, all of Switzerland, and Andreas Valet, Eimeldingen, Fed. Rep. of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jun. 3, 1988, Ser. No. 202,724

Claims priority, application Switzerland, Jun. 4, 1987, 2113/87

Int. Cl.[4] C08K *5/34*

U.S. Cl. 524—91 **23 Claims**

1. Light-stabilized polymer microparticles having a particle size distribution of 0.01–20 μm, obtainable by copolymerization of (a) one or more ethylenically unsaturated monomeric compounds or/and one or more different monomers selected from the group comprising polyalcohols, polycarboxylic acids, hydroxycarboxylic acids, lactones, aminocarboxylic acids, aminoalcohols and polyamines, and (b) at least one epoxide compound which contains at least one further reactive group, essentially only the latter taking part in the copolymerization, so that the resulting microparticles contain free epoxy groups, which microparticles contain 0.1 to 30% by weight, relative to the monomers employed, of one or more light stabilizers, wherein at least part of the polymerization of the monomers is carried out in the presence of the light stabilizer.

4,894,400

STABILIZED SYNTHETIC POLYMER COMPOSITION

Tohru Haruna, Okegawa; Masayuki Takahashi, Tokorozawa, and Kazunori Nishikawa, Matsudo, all of Japan, assignors to Adeka Argus Chemical Co. Ltd., Tokyo, Japan

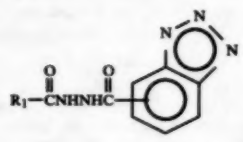
Filed Aug. 5, 1988, Ser. No. 229,144

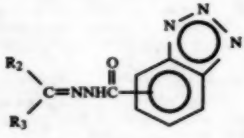
Claims priority, application Japan, Aug. 5, 1987, 62-195554

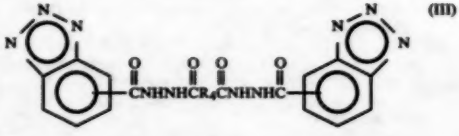
Int. Cl.[4] C08K *5/34*

U.S. Cl. 524—91 **3 Claims**

1. A synthetic polymer composition which comprises 100 parts by weight of a synthetic polymer and 0.001 to 5 parts by weight of at least one of benzotriazol compounds represented by the formulae (I), (II) and (III):







in which R_1 is an organic monocarboxylic radical selected from the group consisting of formic acid, acetic acid, butyric acid, octylic acid, neodecanoic acid, lauric acid, stearic acid, hydroxystearic acid, benzoic acid, toluylic acid, 4-t-butylbenzoic acid, 3,5-di-t-butyl-4-hydroxybenzoic acid, salicylic acid; 3-methyl-salicylic acid, 5-methyl-salicylic acid, 5-methoxy-salicylic acid, 5-t-butyl-salicylic acid, 5-t-octyl-salicylic acid, 5-cyclohexyl-salicylic acid; 3,5-di-t-butyl-4-hydroxyphenyl-

propionic acid, 3-t-butyl-4-hydroxy-5-methylphenylpropionic acid, phenoxypropionic acid and laurylthiopropionic acid; 3,5-di-t-butyl-4-hydrozybenzylthioacetic acid and benzotriazolecarboxylic acid, R_2 and R_3 are members selected from the group consisting of hydrogen, alkyl and aryl radicals, and R_4 is an organic dicarboxylic radical.

4,894,401

COLOR STABILIZED IRRADIATED POLYCARBONATE COMPOSITIONS

Linda H. Nelson, Evansville, Ind., assignor to General Electric Company, Mt. Vernon, Ind.

Filed Dec. 22, 1986, Ser. No. 944,035
Int. Cl.[4] C08K 5/15; C08F 283/02
U.S. Cl. 524—109 **11 Claims**

1. A composition sufficiently irradiated to achieve sterilization comprising:

(i) at least one aromatic carbonate resin; and

(ii) an antiyellowing upon exposure to sterilizing irradiation effective amount of at least one epoxide compound selected from epoxides containing at least 1 quaternary oxirane ring carbon atom, epoxides having each of the 2 oxirane ring carbon atom bonded to at least 1 aromatic hydrocarbon moiety or substituted aromatic hydrocarbon moiety, or mixtures thereof.

4,894,402

POLYPHENYLENE COMPOSITIONS HAVING IMPROVED MELT BEHAVIOR AND IMPACT

Visvaldis Abolins, Delmar; Joseph C. Golba, Jr., Ballston Spa, and Thomas A. Morelli, Delmar, all of N.Y., assignors to General Electric Company, Selkirk, N.Y.

Continuation of Ser. No. 810,465, Dec. 18, 1985, abandoned.
This application Apr. 30, 1987, Ser. No. 44,868
Int. Cl.[4] C08J 11/28; C08L 71/04
U.S. Cl. 524—157 **10 Claims**

1. A thermoplastic composition having improved impact strength and melt behavior consisting essentially of:

(a) a polyphenylene ether resin having an intrinsic viscosity less than approximately, 0.42 dl/g as measured in chloroform at 25° C.;

(b) a compound of the formula R-SO $_3$X wherein R represents an alkyl or aralkyl radical having 5 to 25 carbon atoms and X represents an alkali metal ion, in an amount effective for improving the melt behavior of said polyphenylene ether resin; and

(c) an impact strength improving amount of an acrylate-styrene-acrylonitrile terpolymer.

4,894,403

POLYISOCYANATE COMPOSITIONS CONTAINING RIGID COMPOUNDS OR POLYMERS, AND POLYURETHANES PREPARED THEREFROM

Oomman P. Thomas; Richard D. Peffley, both of Lake Jackson, and Earl E. Burt, III, Clute, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jul. 14, 1987, Ser. No. 73,045
Int. Cl.[4] C08G 18/14
U.S. Cl. 524—216 **13 Claims**

1. A solution or dispersion in a polyisocyanate of a polymer of an ethylenically unsaturated monomer having a rigid moiety comprising at least two aromatic nuclei which are connected by a covalent bond or a connecting group which is capable of participating in conjugation with the aromatic nuclei.

4,894,404

MOLDING COMPOSITIONS BASED ON POLY(1,4-CYCLOHEXYLENE DIMETHYLENE TEREPHTHALATE) CONTAINING AN AMIDE CRYSTALLIZATION AID

Larry A. Minnick, Bluff City, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 19, 1988, Ser. No. 245,599
Int. Cl.[4] C08K 5/20
U.S. Cl. 524—226 **6 Claims**

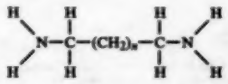
1. A reinforced polyester molding composition having an improved crystallization rate comprising

(a) poly (1,4-cyclohexylene dimethylene terephthalate) having an inherent viscosity of about 0.5 to 1.0,

(b) about 10% to 55%, based on the total composition weight, of glass fibers having a length of about $\frac{1}{4}$ to 2 inches, and

(c) about 2% to 15%, based on the total composition weight, of the reaction product of

(1) an aliphatic diamine of the formula



wherein n is an integer of from 0 to 10, and

(2) a monocarboxylic acid selected from aliphatic organic acids having a carbon chain length of 8 to 36, benzoic acid, and benzoic acid substituted with an alkyl group of 1 to 12 carbon atoms.

4,894,405

CONCRETE AND MASONRY WATERPROOFING COMPOSITION

Larry R. Barron, Mentor, Ohio, assignor to Tremco Incorporated, Cleveland, Ohio

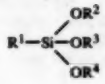
Filed Nov. 25, 1988, Ser. No. 276,004
Int. Cl.[4] C08L 75/04
U.S. Cl. 524—265 **20 Claims**

1. A coating penetrant composition, comprising:

from about 60 percent to about 95 percent by weight of a polyisocyanate terminated polyurethane prepolymer based upon the total weight of said polyurethane prepolymer and a penetrant, from about 5 percent to about 40 percent by weight of a penetrant based upon the total weight of said penetrant and said polyurethane prepolymer, said polyisocyanate terminated polyurethane prepolymer made from the reaction of a polyether polyol intermediate, a polyester polyol intermediate, or combinations thereof, with a polyisocyanate,

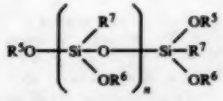
said penetrant being an organosilane having the formula:

(FORMULA I)



wherein R^1 is an aliphatic having from 1 to 18 carbon atoms, wherein R^2, R^3 and R^4, independently, is an alkyl having from 1 to 6 carbon atoms; or an organosiloxane having the formula:

(FORMULA II)



wherein R^7 is an aliphatic having from 1 to 18 carbon

atoms, and wherein R^5 and R^6, independently is an alkyl having from 1 to 6 carbon atoms, wherein n is from 2 to 20; or combinations thereof.

4,894,406

LOW ODOR COALESCING AID FOR LATEX PAINTS

Richard L. Smith, Kingsport, Tenn., and Garland P. Sprinkle, Jr., Louisville, Ky., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 19, 1988, Ser. No. 233,778

Int. Cl.[4] C08K 5/10

U.S. Cl. 524—310 **2 Claims**

1. A paint composition which comprises a water-based latex dispersion and an effective amount of a coalescing aid selected from the group consisting of 2-ethyl-1,3-hexanediol monobutyrate, 2-ethyl-1,3-hexanediol isobutyrate, 2-methyl-1,3-hexanediol isobutyrate, and 2-methyl-1,3-hexanediol monobutyrate.

4,894,407

COMPOSITION FOR EXTRACTING GOLD AND SILVER ANIONS FROM ALKALINE SOLUTIONS AND PROCESSES FOR MAKING SAME

Jan D. Miller, Salt Lake City, Utah, and Spiro D. Alexandratos, Knoxville, Tenn., assignors to University of Utah, Salt Lake City, Utah

Continuation of Ser. No. 774,549, Sep. 10, 1985, abandoned, which is a continuation-in-part of Ser. No. 527,311, Aug. 26, 1983, Pat. No. 4,540,435. This application Aug. 15, 1988, Ser. No. 232,309

Int. Cl.[4] C08K 3/10

U.S. Cl. 524—413 **7 Claims**

1. A composition comprising;

a solid substrate;

a strong solvating extractant attached to said solid substrate, wherein said strong solvating extractant is a phosphonate ester having the following formula:

wherein R_1 is poly (vinyl benzyl) and R_2 and R_3 are alkyl groups having from one to ten carbon atoms; and gold cyanide anions or silveer cyanide anions in contact with said strong solvating extractant.

4,894,408

THERMOPLASTIC OLEFIN COMPOSITIONS OF EPDM RUBBER AND ETHYLENE COPOLYMER RESIN

Donald R. Hazelton, Chatham, and Robert C. Puydak, Cranbury, both of N.J., assignors to Exxon Chemical Patents Inc., Linden, N.J.

Filed Aug. 23, 1988, Ser. No. 235,858

Int. Cl.[4] C08L 23/28, 23/32, 23/08, 33/00

U.S. Cl. 524—425 **23 Claims**

1. A thermoplastic olefin composition comprising an EPDM rubber fully cured by dynamic vulcanization in a thermoplastic resin consisting of (A) from 25 to 100 wt% of an ethylene copolymer resin selected from the group consisting of copolymers of ethylene with vinylacetate, copolymers of ethylene with alpha, beta monoethylenically unsaturated monocarboxylic acids and copolymers of ethylene with alkyl esters of said acids and (B) from 0 to 75 wt% of at least one additional polyolefin resin selected from the group consisting of polybutylene, low density polyethylene, very low density polyethylene, and linear low density polyethylene.

4,894,409

RUBBER COMPOSITION

Noboru Shimada, Yokkaichi; Iwakazu Hattori, Aichi; Mitsuhiko Sakakibara, Matsudo; Noboru Oshima, Suzuka; Tatsuro Hamada, Higashimurayama; Hiromi Fukuoka, Kodaira, and Tatsuo Fujimaki, Higashimurayama, all of Japan, assignors to Japan Synthetic Rubber Co., Ltd. and Bridgestone Corporation, both of Tokyo, Japan

Filed Jul. 14, 1988, Ser. No. 218,797

Claims priority, application Japan, Jul. 17, 1987, 62-179670

Int. Cl.[4] C08F 4/00; C08J 3/34

U.S. Cl. 524—492 **13 Claims**

1. A rubber composition comprising not less than 20% by weight of an amino group-containing diene based polymer in a rubber component, and 10 to 100 parts by weight of silica as a filler with respect to 100 parts by weight of the rubber component, said amino group-containing diene based polymer being obtained by polymerizing a monomer or copolymerizing said monomer in an organic solvent in the presence of at least one of an organic alkali metal and an organic alkaline earth metal.

4,894,410

FLUORINE-CONTAINING POLYMERS WITH PENDENT THIOORGANO GROUPS

Robert E. Kolb, St. Paul, Minn.; Paul F. Tuckner, Hudson, Wis., and Richard A. Guenthner, Birchwood, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Mar. 9, 1988, Ser. No. 165,936

Int. Cl.[4] C08F 8/34

U.S. Cl. 524—545 **8 Claims**

1. Fluorine-containing polymers consisting essentially of (A) fluorine-containing homo- or co-polymers containing 20 to 76 weight percent carbon-bonded fluorine and comprising interpolymerized, repeating units of one or more fluoromonomers, and optionally one or more non-fluorinated monomers, wherein said non-fluorinated monomers are selected from the group consisting of ethylene, propylene, and butene and (B) a plurality of pendent, monothioorgano groups.

4,894,411

COMPOSITE MATERIAL AND PROCESS FOR PRODUCING THE SAME

Akane Okada; Masaya Kawasumi; Mazno Kohzaki; Megumi Fujimoto; Yoshitsugu Kojima; Toshio Kurauchi, and Osami Kamigaito, all of Aichi, Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Aichi, Japan

Filed Mar. 14, 1988, Ser. No. 168,133

Claims priority, application Japan, Mar. 18, 1987, 62-63365; Jul. 3, 1987, 62-167250

Int. Cl.[4] C08K 3/34, 5/13, 5/17, 5/52

U.S. Cl. 524—710 **12 Claims**

1. A process for producing a composite material which comprises a contacting step of contacting a layered clay mineral having a cation exchange capability of 50 to 200 milliequivalents per 100 g with a swelling agent, thereby forming a complex which has the property of being swollen by a molten polyamide monomer, a mixing step of mixing said complex with a monomer of polyamide, and a polymerization step of polymerizing said monomer contained in said mixture by heating said mixture, and adding a substance to control the crystalline structure or molecular structure of the polyamide-containing resin in the mixing step and/or the polymerization step wherein the substance is a polyamine and is at least one member selected from diamines, triamines, and tetramines, pentamines, and aliphatic polyamines.

2. A process for producing a composite material which comprises a contacting step of contacting a layered clay mineral having a cation exchange capacity of 50 to 200 milliequivalents per 100 g with a swelling agent, thereby forming a complex which has the property of being swollen by a molten polyamide monomer, a mixing step of mixing said complex

with a monomer of polyamide, and a polymerization step of polymerizing said monomer contained in said mixture by heating said mixture, and adding a substance to control the crystalline structure of molecular structure of the polyamide-containing resin in the mixing step and/or the polymerization step wherein the substance is a stabilizer and is at least one member selected from phenol derivatives and organophosphoric compound and is present in an amount of 0.05 to 5 parts by weight per 100 parts by weight of the resin.

4,894,412

PROCESS FOR PREPARING SELF-CROSSLINKABLE AMINOSILOXANE EMULSION

Fumio Okada, Takasaki; Masaki Tanaka, and Hiroshi Ohashi, both of Annaka, all of Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed May 18, 1988, Ser. No. 195,650

Claims priority, application Japan, May 19, 1987, 62-121985

Int. Cl.[4] C08K 5/16

U.S. Cl. 524—714 **13 Claims**

1. A process for preparing a self-crosslinkable aminosiloxane emulsion, comprising:

dispersing by emulsification in water in the presence of a cationic surface active agent and a nonionic surface active agent;

(A) an organosilicon compound represented by formula (I):

$$R_a^1R_b^2SiO_{\frac{4-(a+b)}{2}} \quad (I)$$

wherein R^1 represents a monovalent hydrocarbon group having 1 to 20 carbon atoms; R^2 has the same definition as R^1 or represents a group represented by the formula: —OX, where X represents a hydrogen atom or a monovalent hydrocarbon group having 1 to 6 carbon atoms; and a represents a number of $0<a\leqq 3$ and b represents a number of $0\leqq b<3$, satisfying $1\leqq a+b\leqq 3$;

(B) an organosilicon compound represented by formula (II):

$$R_c^3R_d^2SiO_{\frac{4-(c+d)}{2}} \quad (II)$$

wherein R^3 represents a monovalent hydrocarbon group containing a nitrogen atom; R^2 is as defined above; and c represents a number of $0<c\leqq 3$ and d represents a number of $0\leqq d<3$, satisfying $1\leqq c+d\leqq 3$; and

(C) at least one member selected from the group consisting of an organosilane represented by formula (III):

$$R^1Si(OX)_3 \quad (III)$$

wherein R^1 and X are as defined above,

and a partial hydrolysis-condensation product thereof;

subsequently carrying out emulsion polymerization in the presence of an alkaline catalyst selected from the group consisting of sodium hydroxide, potassium hydroxide, rubidium hydroxide, sodium carbonate and tetraalkyl ammonium hydroxides; and

thereafter neutralizing the reaction mixture with an acid selected from the group consisting of organic acids and inorganic acids.

4,894,413

POLYBUTADIENE-EPOXY-ANHYDRIDE LAMINATING RESINS

Ephraim H. Catsiff, Palos Verdes Peninsula, and William E. Elias, Redondo Beach, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Oct. 9, 1987, Ser. No. 107,144

Int. Cl.[4] C08G 59/24; C08L 51/00

U.S. Cl. 525—65 **5 Claims**

1. In a method for preparing a resin composition for use as a laminate material in printed wiring boards, wherein said method comprises mixing an epoxy-anhydride prepolymer with maleated polybutadiene and a suitable solvent, wherein the improvement comprises:

preparing said epoxy-anhydride prepolymer by mixing a first solid monoanhydride with a cycloaliphatic epoxy wherein the amount of said first solid monoanhydride in less than one half of stoichiometric with respect to the epoxide groups in said cycloaliphatic epoxy, and reacting said mixture of monoanhydride and cycloaliphatic epoxy in the presence of an initiator for a sufficient time to form a prepolymer precursor wherein less than half of the epoxide groups have been reacted;

mixing said prepolymer precursor with an additional second liquid monoanhydride in an amount sufficient to react with the remaining unreacted epoxide groups to forms said epoxy-anhydride prepolymer for further mixing with said maleated polybutadiene to form said resin composition for use as a laminate material in printed wiring boards.

4,894,414

RUBBER-MODIFIED CYANATE ESTER RESINS AND POLYTRIAZINES DERIVED THEREFROM

Philip C. Yang, Midland, and Dale M. Pickelman, Auburn, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jul. 30, 1987, Ser. No. 79,378

Int. Cl.[4] C08L 67/06

U.S. Cl. 525—66 **46 Claims**

1. A method of preparing a cyanate ester resin having incorporated therein grafted rubber particles, comprising the steps of:

(a) emulsifying at least one emulsion polymerizable monomer in an aqueous colloidal dispersion of discrete resin-insoluble rubber particles maintained in a reasonably stable state with a surfactant or emulsifier, wherein the quantity of the emulsion polymerizable monomer is no greater than about 50 percent by weight of the resin-insoluble rubber particles,

(b) polymerizing the resulting emulsion to form a stable colloidal dispersion of resin-insoluble rubber particles wherein essentially every rubber particle is grafted with one or more resin-soluble polymer molecules resulting from the polymerization such that substantially all of the rubber particles are maintained in a discrete spaced apart relationship to each other by the resin-soluble polymer molecules, and

(c) mixing the grafted rubber particles with the cyanate ester resin to a degree sufficient to achieve a homogeneous dispersion.

4,894,415

POLYPHENYLENE ETHER RESIN COMPOSITION

Isao Sasaki; Naoki Yamamoto, both of Hirosbima, and Akira Yanagase, Otake, all of Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Filed Sep. 10, 1987, Ser. No. 95,001

Claims priority, application Japan, Sep. 11, 1986, 61-214871

Int. Cl.[4] C08F 283/12, 71/04

U.S. Cl. 525—68 **10 Claims**

1. A polyphenylene ether resin composition comprising

(A) a polyphenylene ether resin,

(B) a polystyrene resin, and

(C) a graft copolymer

prepared by graft-polymerizing one or more vinyl monomers onto a compound rubber having an average particle diameter of 0.08 to 0.6 μm and a structure wherein 10 to 90% by weight of a polyorganosiloxane rubber component and 90 to 10% by weight of a polyalkyl (meth)acrylate rubber component are tangled with each other so as not to separate, the total amount of the polyorganosiloxane rubber component and the polyalkyl (meth)acrylate rubber component being 100% by weight of the compound rubber.

4,894,416

LOW GLOSS THERMOPLASTIC BLENDS

Robert R. Gallucci, Mt. Vernon, Ind., assignor to General Electric Company, Mt. Vernon, Ind.

Filed Dec. 27, 1988, Ser. No. 289,938

Int. Cl.[4] C08L *51/00*

U.S. Cl. 525—74 **11 Claims**

1. A low-gloss thermoplastic blend comprising a core-shell ASA (acrylate-styrene-acrylonitrile interpolymer) resin blended with an effective gloss-reducing amount of at least one polymer of glycidyl (meth)acrylate.

4,894,417

POLYMERIC COMPOSITION

Geoffrey Holden, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Oct. 12, 1988, Ser. No. 256,517

Int. Cl.[4] C08L *23/10, 23/18, 53/02*

U.S. Cl. 525—98 **9 Claims**

1. A thermoplastic elastomer composition comprising:

(a) from about 20 to about 70 weight percent of a polymer of a lower α-olefin having from 2 to 5 carbon atoms;

(b) from about 20 to about 70 weight percent of a polymer of a 4-methyl-1-pentene polymer; and

(c) from about 5 to about 25 weight percent of a block copolymer comprising at least two polymeric blocks predominantly polymerized from monoalkenyl-aromatic hydrocarbon monomer units and at least one polymeric block predominantly polymerized from conjugated diolefin monomer units which at least one polymeric block is selectively hydrogenated after polymerization.

4,894,418

VULCANIZABLE COMPOSITIONS OF FLUOROELASTOMERS HAVING IMPROVED CHARACTERISTICS OF PROCESSABILITY AND OF CHEMICAL STABILITY

Ezio Strepparola, Treviglio; Giovanni Moggi, Milan; Cinzia Di Fede, Casciago, and Gianna Cirillo, Genoa, all of Italy, assignors to Ausimont S.p.A., Milan, Italy

Continuation of Ser. No. 928,407, Nov. 10, 1986, abandoned. This application Jan. 23, 1989, Ser. No. 300,200

Claims priority, application Italy, Nov. 15, 1985, 22865 A/85

Int. Cl.[4] C08J *3/18*; C08L *27/16, 27/18, 27/20*

U.S. Cl. 525—185 **10 Claims**

1. Vulcanizable compositions of fluoroelastomers based on vinylidene fluoride having improved processability and improved chemical stability, comprising, as a processing coadjuvant, a mono- or di-hydroxypolyfluoroether, the hydroxy group being present at one end of the polyether chain in the case of the mono-hydroxypolyfluoroether and the two hydroxy groups being present at the opposite ends of the polyfluoroether chain in the case of the di-hydroxypolyfluoroether, said mono- or di-hydroxypolyfluoroether having no other functional groups beside the hydroxy group at the end or ends of the polyfluoroether chain, and having a mean molecular weight ranging from 400 to 10,000 for the mono-hydroxypolyfluoroether and ranging from 2,500 to 10,000 for the di-hydroxypolyfluoroether, wherein the mono-hydroxypolyfluoroether comprises repeating fluoropolyoxylalkylene units selected from the units;

(1) C_3F_6O and CFXO whre X=F or CF_3 and said units are statistically distributed along the fluoropolyoxylalkylene chain,

(2) C_3F_6O or

(3) $CH_2CF_2CF_2O$, and wherein the di-hydroxypolyfluoroether comprises fluoropolyoxyalkylene units;

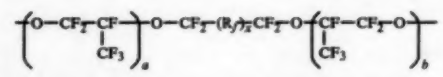
(4) C_2F_4O and CF_2O and said units are statistically distributed along the fluoropolyoxyalkylene chain,

(5) C_3F_6O, C_2F_4O and CFXO where X=—F or —CF_3 and said units are statically distributed along the fluoropolyoxyalkylene chain,

(6) $CH_2—CF_2—CF_2—O—$ and said units within the fluoropolyoxyalkylene chain are linked to one another in the following manner, $—(O—CF_2—CF_2CH_2)_p—O—R_f—O—(CH_2—CF_2—CF_2—O)_q—$, wherein R_f is a fluoroalkylene group, and p and q are integers, or

(7)

and said units are linked to one another inside the fluoropolyoxyalkylene chain in the following manner



wherein R_f is a fluoroalkylene group, z is 0 or 1, and a and b are integers, said mono- or di- hydroxypolyfluoroethers being used in an amount from 0.5 to 15 parts by weight per 100 parts of fluoroelastomers.

4,894,419

BIAXIALLY-STRETCHED FILM MADE OF POLY(ARYLENE SULFIDE) RESIN COMPOSITION AND PRODUCTION PROCESS THEREOF

Toshiya Mizuno; Yoshikichi Teramoto; Takeshi Saito, all of Tsuchiura, and Juichi Wakabayashi, Tamari, all of Japan, assignors to Kureha Kagaku Kogyo K.K., Tokyo, Japan

Filed May 6, 1988, Ser. No. 191,131

Claims priority, application Japan, May 15, 1987, 62-116777; Mar. 23, 1988, 63-67272

Int. Cl.[4] C08L *81/06*; B29D *7/26*

U.S. Cl. 525—189 **6 Claims**

1. In a biaxially-stretched film made of a poly(arylene sulfide) resin composition, the improvement wherein the composition comprises 100 parts by weight of a substantially linear poly(arylene sulfide) having a melt viscosity of at least 1,000 poises and 10–80 parts by weight of a polystrene resin.

4,894,420

TIRE WITH TREAD OF SELECTIVE RUBBER BLEND

Richard M. Scriver, Atwater, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Sep. 14, 1988, Ser. No. 243,970

Int. Cl.[4] C08L *9/00, 9/02/9/06, 7/00*

U.S. Cl. 525—237 **5 Claims**

1. A pneumatic tire having an outer circumferential tread where said tread is a sulfur cured rubber composition comprised of, based on 100 parts by weight rubber (phr). (A) about 30 to about 90 parts by weight cis 1,4-polyisoprene rubber having a cis 1,4-content of about 96 to about 99 percent, (B) about 5 to about 20 parts by weight of at least one synthetic rubber selected from at least one of isoprene/acrylonitrile copolymer and butadiene/acrylonitrile copolymer comprised of from about 20 to about 40 mole percent units derived from acrylonitrile and about 60 to about 80 mole percent units de-

rived from isoprene or butadiene in which the glass transition temperature of the rubber is from about −40° C. to about -31 5° C. where said copolymers are random emulsion polymerization prepared copolymers, and (C) about 0 to about 35 parts by weight of at least one of styrene/butadiene copolymer rubber, 1,4-polybutadiene rubber containing up to 10 percent vinyl unsaturation and 1,4-polybutadiene rubber having from 30 to 70 percent vinyl unsaturation, isoprene/butadiene rubber or styrene/isoprene/butadiene rubber.

4,894,421

LOW-CRYSTALLINE PROPYLENE RANDOM COPOLYMER COMPOSITION, PROCESS FOR PRODUCTION THEREOF, AND POLYPROPYLENE COMPOSITE LAMINATED STRUCTURE

Mamoru Kioka; Masahiro Sugi; Akinori Toyota, and Norio Kashiwa, all of Iwakuni, Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Division of Ser. No. 106,585, Oct. 9, 1987, Pat. No. 4,822,840. This application Dec. 30, 1988, Ser. No. 292,539

Claims priority, application Japan, Oct. 9, 1986, 61-239340; Oct. 9, 1986, 61-239341; Jul. 15, 1987, 62-174833

Int. Cl.[4] C08F *255/04*; C08L *23/16*

U.S. Cl. 525—243 **16 Claims**

1. A process for producing a low-crystalline propylene random copolymer composition, which comprises, in combination,

(1) a suspension polymerization step of copolymerizing propylene, ethylene and an alpha-olefin having 4 to 20 carbon atoms in liquid propylene as a solvent in the presence of an alpha-olefin pre-polymerized catalyst and optionally an electron donor, said catalyst being obtained by pre-polymerizing an alpha-olefin having 2 to 10 carbon atoms in the presence of a catalyst formed from (A) a highly active and highly stereoregular titanium catalyst component comprising magnesium, titanium, halogen and an electron donor as essential ingredients and having an average particle diameter of about 5 to about 200 microns and a geometric standard deviation of its particle size distribution of less than 2.1, (B) an organometallic compound of a metal of Groups I to III of the periodic table and (C) an electron donor, the amount of the alpha-olefin being 1 to 2000 g per gram of the titanium catalyst component (A),

(2) a step of vaporizing the liquid unreacted materials in the polymerization reaction mixture obtained in the suspension polymerization step (1) by flushing, thereby to form a propylene random copolymer [I] composed of 86 to 97 mole % of recurring units (a) derived from propylene, 0.5 to 6 mole % of recurring units (b) derived from ethylene and 2 to 13 mole % of recurring units (c) derived from an alpha-olfein having 4 to 20 carbon atoms, the mole ratio c/(b+c) being from 0.3 to 0.9, and

(3) a vapor-phase polymerization step of copolymerizing propylene and an alpha-olefin having 4 to 20 carbon atoms in the presence of the propylene random copolymer [I] under such conditions that the reaction system form a vapor phase, thereby to form a low-crystalline propylene random copolymer [II] composed of 10 to 90 mole % of recurring units (d) derived from propylene and 10 to 90 mole % of recurring units (e) derived from the alpha-olefin having 4 to 20 carbon atoms.

4,894,422

N-SULFOALKYL POLYAMIDE WATER SOLUBLE HYDROPHOBICALLY-ASSOCIATING RIGID ROD POLYMER

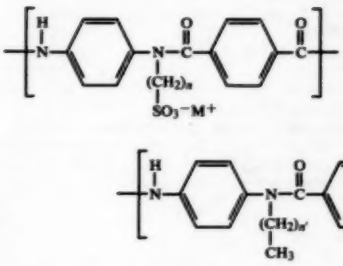
Dennis G. Peiffer, East Brunswick, and Jeff J. Kaladas, South Bound Brook, both of N.J., assignors to Exxon Research & Engineering Company, Florham Park, N.J.

Continuation-in-part of Ser. No. 135,973, Dec. 21, 1987, abandoned. This application Dec. 19, 1988, Ser. No. 286,098

Int. Cl.[4] C08G *69/48*

U.S. Cl. 525—420 **3 Claims**

1. A water soluble or brine soluble rod-like polymer having recurring units of the formula:



wherein n and n' are a 2 to 22 straight chained or branched chained alkyl or cycloalkyl group, and the level of sulfonation is about 20 to about 100 mole and M is a tertiary amine or a metal cation selected from the group consisting of aluminum, iron, lead, Groups IA, IIA, IB and IIB of the Periodic Table of Elements and level of alkylation is about 1.0 to about 60 mole %.

4,894,423

ENVIRONMENTAL STRESS FAILURE RESISTANT POLYCARBONATE

Hani Farah, Sugarland; Chai J. Chou, Missouri City, and Stephen M. Hoenig, Lake Jackson, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Nov. 7, 1988, Ser. No. 268,132

Int. Cl.[4] C08F *283/02*; C08L *69/00*

U.S. Cl. 525—468 **11 Claims**

1. A thermoplastic molding composition, comprising:

A. an aromatic polycarbonate; and

B. a copolymer of ethylene and carbon monoxide.

4,894,424

POLYMERISATION OF OLEFINS USING MODIFIED ZIEGLER-NATTA CATALYST

Dominique Lassalle, Martigues, France, assignor to BP Chemicals Limited, London, England

Continuation of Ser. No. 911,472, Sep. 25, 1986, abandoned. This application Jun. 8, 1988, Ser. No. 204,984

Claims priority, application France, Oct. 11, 1985, 85 15239

Int. Cl.[4] C08F *4/64, 10/00*

U.S. Cl. 526—125 **9 Claims**

1. A process for polymerising ethylene or propylene, or copolymerising ethylene with alpha-olefins comprising from 3 to 12 carbons, or propylene with ethylene and/or 1-butene, in suspension in a liquid hydrocarbon diluent or in a gas phase, under a pressure from 0.5 to 5 MPa and at a temperature from 50° C. to 110° C., in the presence of a Ziegler-Natta catalytic system comprising, as catalyst, a particulate solid material based on magnesium, chlorine, titanium and/or vanadium prepared under substantially anhydrous conditions and being substantially free from metal/carbon chemical bonds, and as co-catalyst, at least one organoaluminium compound charac-

terised in that prior to contacting the catalyst with the co-catalyst to form the catalytically active system, the particulate solid material is treated with from 0.1 to 5 moles of water per gram atom of titanium and/or vanadium present in the catalyst.

4,894,425

PREPARATION OF POLYISOPRENE HAVING HIGH CONTENT OF 1,2- AND 3,4-STRUCTURAL UNITS BY ANIONIC POLYMERIZATION

Walter Hellermann, Dorsten; Karl-Heinz Nordsiek, Marl, and Jürgen Wolpers, Haltern, all of Fed. Rep. of Germany, assignors to Huels Aktiengesellschaft, Marl, Fed. Rep. of Germany

Filed May 29, 1987, Ser. No. 55,543

Claims priority, application Fed. Rep. of Germany, May 31, 1986, 3618351; Jun. 27, 1986, 3621628; Dec. 18, 1986, 3643250; Mar. 7, 1987, 3707434

Int. Cl.[4] C08F 4/48

U.S. Cl. 526—181 **11 Claims**

1. A process for the preparation of polyisoprene which may possess functional groups and contains more than 70% of 1,2- and 3,4-structural units by anionic polymerization of isoprene in an inert hydrocarbon solvent in the presence of an organolithium compound as the catalyst and an ether as the cocatalyst, wherein the cocatalyst used is an ethylene glycol dialkyl ether of the formula

$$R_1—O—CH_2—CH_2—O—R_2$$

in which R_1 and R_2 are alkyl groups having different numbers of C atoms, from the group consisting of methyl, ethyl, n- and isopropyl and n-, iso-, sec.- and tert. -butyl, and wherein the sum of the C atoms in the two alkyl groups R_1 and R_2 is 5 to 7.

4,894,426

FAST-CURE POLYURETHANE SEALANT COMPOSITION CONTAINING SILYL-SUBSTITUTED PIPERAZINE ACCELERATORS

Jamil Baghdachi, Northville, and Keith H. Mahoney, Grosse Pointe City, both of Mich., assignors to BASF Corporation, Clifton, N.J.

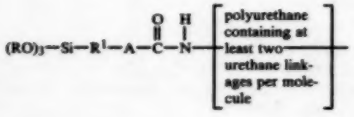
Filed Aug. 19, 1988, Ser. No. 234,221

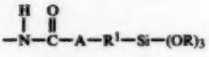
Int. Cl.[4] C08G 77/06

U.S. Cl. 528—22 **11 Claims**

1. A one-component, moisture-curable sealant composition comprising a mixture of

(a) a silane-terminated polyurethane polymer of the formula





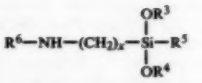
wherein

R is lower alkyl of from 1 to 6 carbon atoms;

R^1 is a divalent bridging radical selected from the group consisting of a divalent hydrocarbon radical, a divalent hydrocarbon ether radical, and a divalent hydrocarbon amino radical;

A is selected from the group consisting of —S— and —NR_2— where R^2 is hydrogen or alkyl of from one to six carbon atoms;

(b) from 0.2 to 1.0 parts by weight of an aminosilane per 100 parts by weight of said silane-terminated polyurethane polymer, said aminosilane having the structure



wherein

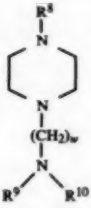
x is an integer of from one to three;

R^3 and R^4 may be the same or different and are selected from alkyl of from one to four carbon atoms;

R^5 is alkyl of from one to four carbon atoms or alkoxyl of from one to four carbon atoms;

R^6 is hydrogen or —$(CH_2)_yNHR^7$ wherein R^7 is hydrogen or —$(CH_2)_yNH_2$ and y and z may be the same or different and are integers of from one to three;

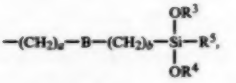
(c) from 0.2 to 1.0 parts by weight of an accelerator per 100 parts by weight of said silane-terminated polyurethane polymer, said accelerator selected from the group consisting of compounds or mixtures thereof having the structure



where

w is an integer of from one to five,

R^8, is hydrogen or

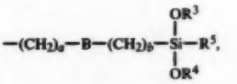


where a is an integer of from one to four, b is zero or an integer of from one to four, B is a direct bond or is a divalent hydrocarbaryl radical or a divalent cyclohydrocarbyl radical, and R^3, R^4, and R^5 are as previously defined,

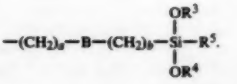
R^9 and R^{10} are independently

hydrogen,

alkyl of from one to five carbon atoms, or



where a, b, B, R^3, R^4, and R^5, are as defined above, with the proviso that at least one of R^8, R^9 and R^{10} must be



4,894,427

AROMATIC POLYESTER-POLYORGANOSILOXANE BLOCK COPOLYMER

Naoki Yamamoto; Hiroshi Mori, both of Hiroshima; Akira Nakata, Otake, and Misayo Suehiro, Hiroshima, all of Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Filed Sep. 29, 1988, Ser. No. 250,859

Claims priority, application Japan, Sep. 30, 1987, 62-243561; Aug. 8, 1988, 63-196019

Int. Cl.[4] C08G *77/04*

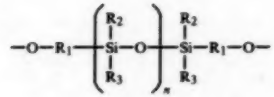
U.S. Cl. 528—26 **11 Claims**

1. An aromatic polyester-polyorganosiloxane block copolymer comprising a polyester segment consisting essentially of:

(a) an aromatic polyester of an aromatic dicarboxylic acid, or mixtures thereof, and a dihydric phenol, a lower aliphatic diol, an alicyclic diol, or mixtures thereof,

(b) an aromatic polyester of an aromatic hydroxycarboxylic acid or mixtures thereof, or

(c) a copolymer of (a) and (b), and a polyorganosiloxane segment having a recurring unit represented by the following formula:



in which R_1 represents a lower alkylene group or a lower alkylene ether group; R_2 and R_3 independently represent a methyl group or a phenyl group; and n represents an integer not smaller than 10, in which bonding between the polyester segment and the polyorganosiloxane segment is an ester linkage formed by a condensation reaction between the terminal carboxyl group of the polyester segment and the terminal hydroxyl group of the polyorganosiloxane segment.

4,894,428

PROCESS FOR COATING SUBSTRATES WITH POLYURETHANE UREAS

Wilhelm Thoma, Leverkusen; Josef Pedain, Cologne, and Waldemar Kling, Kuerten-Bechen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany

Filed Jan. 3, 1989, Ser. No. 292,698

Claims priority, application Fed. Rep. of Germany, Jan. 9, 1988, 3800435

Int. Cl.[4] B05D *3/02*; C08G *18/10*

U.S. Cl. 528—45 **9 Claims**

1. A process for coating a substrate with a polyurethane urea which comprises reacting a prepolymer based on an aromatic polyisocyanate containing an average of two ketoxime blocked NCO groups and having an average molecular weight of about 500 to 15,000 with (B) a chain-extending agent corresponding to the formula

$$H_2N—R'—NH_2$$

in which R' is an aliphatic or cycloaliphatic radical, in the presence of a solvent at a temperature of greater than 50° C. and at an equivalent ratio of blocked isocyanate groups to NH_2 groups of 1.43 to 1.02 until about 40 to 90% of the amino groups have reacted, applying the partially reacted prepolymer to a substrate and crosslinking the coating at a temperature of greater than 120° C.

9. A coated substrate produced in accordance with the process of claim 1.

4,894,429

PROCESS FOR THE PREPARATION OF POLYURETHANES CONTAINING URETDIONE RINGS

Gerhard Grögler; Heinrich Hess, both of Leverkusen, and Richard Kopp, Köln, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany

Division of Ser. No. 120,303, Nov. 13, 1987, Pat. No. 4,786,655.

This application Aug. 26, 1988, Ser. No. 237,117

Claims priority, application Fed. Rep. of Germany, Nov. 29, 1986, 3640855

Int. Cl.[4] C08G *18/00*

U.S. Cl. 528—45 **4 Claims**

1. A process for the production of a polyurethane in which

(a) an organic polyisocyanate which is at least 50 wt. % diisocyanate containing a uretdione ring, wherein said diisocyanate is in a blocked solid form,

is reacted with

(b) a relatively high molecular weight organic dihydroxyl compound

in the presence of

(c) a bismuth salt of an organic carboxylic acid and

(d) a low molecular weight aromatic diamine in a quantity which is from 5 to 10 times the quantity of the bismuth salt (c) used.

4,894,430

NEW POLYESTER POLYOLS AND THEIR USE AS POLYOL COMPONENT IN TWO-COMPONENT POLYURETHANE LACQUERS

Peter Höhlein, Kempen; Hans-Joachim Höfer; Josef Pedain, both of Cologne, and Manfred Schönfelder, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Nov. 30, 1988, Ser. No. 278,056

Claims priority, application Fed. Rep. of Germany, Dec. 3, 1987, 3740933

Int. Cl.[4] C08G *18/62*

U.S. Cl. 528—75 **5 Claims**

1. A polyester polyol having a hydroxyl number of about 80 to 250 and comprising the reaction product of

(a) about 52 to 60 mole % of a polyol component comprising

(i) about to 2 to 30 mole % of at least one dihydric aliphatic alcohol other than neopentyl glycol which has at least two carbon atoms,

(ii) about 5 to 40 mole % of at least one aliphatic alcohol which has three or more hydroxyl groups and at least three carbon atoms,

(iii) about 20 to 60 mole % of bis-(hydroxymethyl)-cyclohexane and

(iv) about 10 to 50 mole % of neopentyl glycol and

(b) about 40 to 48 mole % of a dicarboxylic acid component comprising

(v) about 50 to 99 mole % of at least one aliphatic, saturated dicarboxylic acid or anhydride of such acid containing at least two carbon atoms and

(vi) about 0.5 to 50 mole % of at least one aliphatic, unsaturated dicarboxylic acid or an anhydride of such an acid containing at least four carbon atoms,

the percentages given under (a) and (b) adding up to 100.

4,894,431

ACCELERATED CURING SYSTEMS FOR EPOXY RESINS

Robert F. Armbruster, Okemos; Rajan Eadara, East Lansing, and William L. Miller, Okemos, all of Mich., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed May 23, 1988, Ser. No. 197,479

Int. Cl.[4] C08G *59/68*

U.S. Cl. 528—90 **14 Claims**

1. A curing system for epoxy resins comprising anhydrous methane sulfonic acid and at least one aliphatic or cycloali-

phatic primary or secondary amine, said acid and said amine being present in a weight ratio of 1:99–10:90.

4,894,432

POLYCARBONATE POLYMER FROM TETRA ARYLENE TRIPHENOL

Kenichi Mizuno; Yozo Jujo, and Hajime Oyoshi, all of Iwakuni, Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

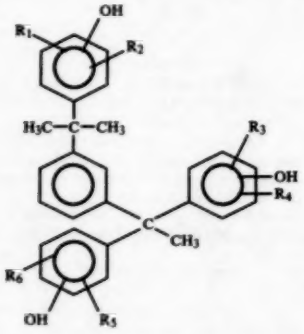
Division of Ser. No. 916,099, Oct. 7, 1986, Pat. No. 4,778,936. This application Aug. 3, 1988, Ser. No. 227,773

Claims priority, application Japan, Oct. 8, 1985, 60-224305; Dec. 20, 1985, 60-287288

Int. Cl.[4] C08G 63/62

U.S. Cl. 528—204 **6 Claims**

1. A polycarbonate comprising (A) a carbonic acid component unit, (B) a divalent phenol component unit, and (c) a triphenol compound component unit derived from the triphenol compound having the formula (I):



wherein R_1, R_2, R_3, R_4, R_5, and R_6, independently, represent hydrogen, a halogen, a C_1–C_5 alkyl group or a C_1–C_5 alkoxy group, the amount of the triphenol compound unit (C) being 0.01 to 10 mol%, based on the divalent phenol component (b) and the intrinsic viscosity, determined at 25° C. in methylene chloride, of the polycarbonate being 0.4 to 1.0 dl/g and the glass transition temperature (Tg), determined by a differential scanning calorimeter, being 150° C. to 300° C.

4,894,433

WATER DISPERSIBLE POLYAMIDE DIETHANOLAMINE ESTER

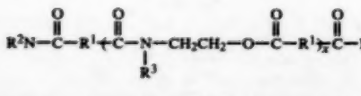
Walter K. Bornack, Jr., Amherst; Roy C. Williams, Orchard Park, both of N.Y., and Keith R. McNally, Bedminster, N.J., assignors to Union Camp Corporation, Wayne, N.J.

Filed Feb. 5, 1988, Ser. No. 152,638

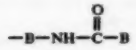
Int. Cl.[4] C08G 63/02

U.S. Cl. 528—272 **12 Claims**

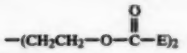
1. A composition comprising the formula:



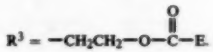
wherein x is an integer of 0–5; R^1 is independently at each occurrence an aliphatic group of up to 40 carbon atoms or polyamide segment; R^2 is independently at each occurrence



(where B is an aliphatic group of up to 10 carbon atoms) or



where E is an aliphatic group of up to 10 carbon atoms or the residue of a cyclic carboxylic anhydride bearing at least one free carboxyl group;



4,894,434

POLYCYANOARYL THIOETHER AND PREPARATION THEREOF

Tetsuya Asahi, and Yozo Kondo, both of Mie, Japan, assignors to Tosoh Corporation, Yamaguchi, Japan

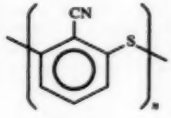
Filed May 19, 1988, Ser. No. 195,927

Claims priority, application Japan, May 20, 1987, 62-121392

Int. Cl.[4] C08G 75/14

U.S. Cl. 528—388 **5 Claims**

1. A polycyanoaryl thioether having a melting point of from 400°–460° C., represented by formula:



where n is a number of not less than 3.

4,894,435

POLYMERIZATION OF OLEFIN/CARBON MONOXIDE WITH NON-TRANSITION METAL SALT, BIDENTATE P LIGAND AND CARBOXYLIC ACID ESTER

Eit Drent, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Division of Ser. No. 61,615, Jun. 15, 1987, Pat. No. 4,810,774. This application Sep. 23, 1988, Ser. No. 248,066

Claims priority, application Netherlands, Jun. 24, 1986, 8601641

Int. Cl.[4] C08G 67/02

U.S. Cl. 528—392 **14 Claims**

1. The process of producing a linear, alternating polymer of carbon monoxide and at least one ethylenically unsaturated hydrocarbon of 2 to 20 carbon atoms inclusive, by contacting carbon monoxide and said hydrocarbon under polymerization conditions in the presence of a catalyst composition prepared from a palladium compound, a non-transition metal salt of non-hydrohalogenic acid having a pKa less than about 6, a bidentate phosphorus ligand of the formula R^1R^2—P—R—P—R^3R^4 in which R^1, R^2, R^3 and R^4 independently are organic radicals of from 1 to 14 carbon atoms inclusive and R is a divalent bridging group of up to 20 carbon atoms and up to three carbon atoms in the bridge, and a carboxylic ester of from 3 to 20 carbon atoms inclusive that is a hydrocarbyl ester or substituted hydrocarbyl ester with substituents which are inert under polymerization conditions, said substituents being selected from hydroxyl, halo or alkoxy group, said carboxylic ester being free from ethylenic unsaturation.

4,894,436

HOMOLOGS OF APROTININ PRODUCED FROM A RECOMBINANT HOST, PROCESS EXPRESSION VECTOR AND RECOMBINANT HOST THEREFOR AND PHARACEUTICAL USE THEREOF

Ernst-August Auerswald; Werner Schröder; Eugen Schnabel; Wolfgang Bruns; Gerd Reinhardt, all of Wuppertal, Fed. Rep. of Germany, and Michael Kotick, Elkhart, Ind., assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Mar. 23, 1987, Ser. No. 29,501

Claims priority, application United Kingdom, Mar. 26, 1986, 8607523

Int. Cl.[4] C07R *7/10*

U.S. Cl. 530—324 8 Claims

1. A microbially produced aprotinin or aprotinin homolog which is substituted in position 52 by an amino acid selected from the group consisting of Glu, Leu, Val, Thr and Ser.

4,894,437

NOVEL RENIN INHIBITING POLYPEPTIDE ANALOGS CONTAINING S-ARYL-D- OR L- OR DL-CYSTEINYL, 3-(ARYLTHIO)LACTIC ACID OR 3-(ARYLTHIO)ALKYL MOIETIES

Ruth E. TenBrink, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

PCT No. PCT/US86/02227, § 371 Date Jun. 29, 1987, § 102(e) Date Jun. 29, 1987, PCT Pub. No. WO87/02986, PCT Pub. Date May 21, 1987

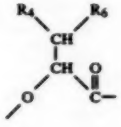
Continuation of Ser. No. 798,459, Nov. 15, 1985, abandoned.

This PCT application Oct. 21, 1986, Ser. No. 85,674

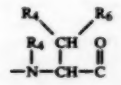
Int. Cl.[4] C07K *7/06;* A61K *37/43;* C07C *101/30*

U.S. Cl. 530—328 6 Claims

1. A renin inhibitory peptide, having a stable transition state insert corresponding to the 10,11 position of the renin substrate, and additionally having a moiety of the formula XL_1 or XL_2 corresponding to the 8-position of the renin substrate



XL_1



XL_2

wherein R_4 at each occurrence is the same or different and is

(a) hydrogen, or

(b) C_1–C_5 alkyl; and

wherein R_6 is

(a) —S—aryl,

(b) —S—C_3–C_7 cycloalkyl, or

(c) —S—C_1–C_5 alkyl.

4,894,438

SYNTHETIC PEPTIDIC SUBSTRATE FOR DETERMINATION OF TRYPSIN AND α_1-ANTITRYPSIN

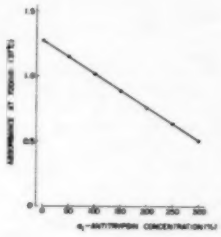
Takeshi Nagasawa, Urawa; Yuko Gemba, Fukushima; Yoshio Nakamura, and Katsumasa Kuroiwa, both of Koriyama, all of Japan, assignors to Nitto Boseki Co., Ltd., Japan

Filed Nov. 21, 1986, Ser. No. 934,249

Claims priority, application Japan, Nov. 26, 1985, 60-265388

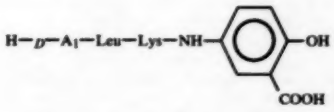
Int. Cl.[4] C07K *5/08*

U.S. Cl. 530—331 3 Claims



1. A synthetic peptide of the formula:

(I)



wherein A_1 is a prolyl (Pro) or alanyl (Ala) group; Leu is a leucyl group; and Lys is a lysyl group, or an acid addition salt thereof.

4,894,439

N-TERMINAL DERIVATIVES OF TUMOR NECROSIS FACTOR PURIFIED BY MICROPOROUS PTFE MEMBRANES

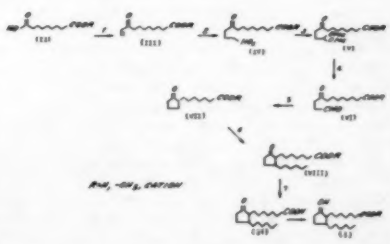
Glenn Dorin, San Rafael, Calif.; Wolfgang H. Hanisch, Brisbane, Australia; James W. Thomson, Albany, Calif.; Sidney N. Wolfe, El Cerrito, Calif., and Leo S. Lin, Walnut Creek, Calif., assignors to Cetus Corporation, Emeryville, Calif.

Filed May 22, 1986, Ser. No. 866,213

The portion of the term of this patent subsequent to Jun. 30, 2004, has been disclaimed.

Int. Cl.[4] C07K *13/00*

U.S. Cl. 530—351 9 Claims



1. A purified TNF composition wherein the TNF is N-terminally deleted, lacking from 1 to 10 amino acids, and is substantially free of pyrogens as determined by the USP rabbit pyro-

gen test at a dosage range of about 1.0 to 2.4×10^5 U/Kg, and is substantially non-bindable to a hydrophobic porous membrane.

4,894,440
METHOD OF ISOLATING MEGAKARYOCYTE STIMULATORY FACTOR

Robert D. Rosenberg, Brookine, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Sep. 17, 1986, Ser. No. 908,183
Int. Cl.[4] C07K 3/28
U.S. Cl. 530—351 13 Claims

1. A method for isolating a megakaryocyte stimulatory factor comprising:

a. preparing a concentrated serum-free supernatant from the cell culture medium of HEK cells;

b. contacting said supernatant with ammonium sulfate having greater than 50% saturation, under conditions sufficient to cause precipitation of proteins in the supernatant;

c. contacting the precipitated proteins obtained in step (b) with buffer comprising Tris-HCl and NaCl under conditions sufficient to solubilize the protein containing the megakaryocyte stimulatory factor;

d. contacting the soluble fraction obtained in step (c) with a lectin-Sepharose resin under conditions sufficient to cause the protein containing the megakaryocyte stimulatory factor to bind to the resin;

e. contacting the lectin-Sepharose resin with chitin oligosaccharides under conditions sufficient to elute the megakaryocyte stimulatory factor from the resin;

f. contacting the eluant from step (e) with a first size-exclusion gel and collecting the fractions obtained therefrom;

g. contacting the fractions obtained in step (f) with a second size-exclusion gel, and collecting the purified megakaryocyte stimulatory factor therefrom.

4,894,441
PROCESS FOR THE PREPARATION OF COLLAGEN AND OBTAINED PRODUCT

Claudio Menicagli, Pisa, Italy, assignor to Istituto Gentili S.p.A., Pisa, Italy

Filed Mar. 3, 1988, Ser. No. 163,531
Claims priority, application Italy, Mar. 12, 1987, 19659 A/87
Int. Cl.[4] C07K 15/20; C07G 7/00; A01N 63/02; B01D 13/00
U.S. Cl. 530—356 3 Claims

1. A process for treating bovine tendon to extract high purity collagen in the form of a viscous gel, said extracted collagen having the triple helix configuration of natural collagen and being suitable for direct use in surgical sponges and the like, said extraction being effected without the use of an enzymatic treatment to solubilize the collagen and said extracted collagen not being subjected to a cross-linking procedure to modify its structure, which comprises: suspending a finely divided mass of bovine tendon in a 0.5-14 2.0 M aqueous acetic acid solution in an amount to provide a bovine tendon/acid weight ratio of 01–0.01/1; mildly agitating the resultant suspension for a period of 24–72 hrs. at a temperature not exceeding about 25° C.; separating the suspended solid phase and precipitating collagen from the liquid phase by the addition thereto of sodium chloride, said precipitated collagen being in the form of a gummy, thready product of milky white color; separating said precipitated collagen and suspending it in acetic acid and agitating until complete gelatin is obtained; diluting the resultant collagen gel to a concentration of 0.005-0.5% and subjecting it to tangential filtration through a molecular exclusion membrane having an exclusion limit of 10,000-100,000 using acetic acid of 0.01–1.0 M whereby a filtrate containing impurities of molecular weight below the exclusion is removed while the collagen gel is retained recycling the collagen gel through tangential filtration until all impurities are removed; recovering and drying the purified collagen gel and lyophilizing the same.

4,894,442
MONOCLONAL ANTIBODIES THAT BIND TO ALPHA-ACID GLYCOPROTEIN

Sakuji Toyama, Kyoto, and Masao Tanihara, Kurashiki, both of Japan, assignors to Kuraray Co., Ltd., Okayama, Japan

Filed Apr. 8, 1986, Ser. No. 849,328
Claims priority, application Japan, Apr. 12, 1985, 60-78965
Int. Cl.[4] C07K 15/00
U.S. Cl. 530—387 2 Claims

1. A monoclonal antibody specific for α_1-acid glycoprotein, which is selected from the group consisting of HA-5 and HA-7.

2. A monoclonal antibody having all the identifying characteristics of HA-13.

4,894,443
TOXIN CONJUGATES

Lawrence I. Greenfield, Albany, Calif.; Donald A. Kaplan, Midland, Mich., and Danute E. Nitecki, Berkeley, Calif., assignors to Cetus Corporation, Emeryville, Calif.

Continuation-in-part of Ser. No. 578,115, Feb. 8, 1984, abandoned. This application Sep. 7, 1984, Ser. No. 648,759
Int. Cl.[4] A61K 39/00, 39/02
U.S. Cl. 530—388 3 Claims

1. A recombinant polypeptide, useful in making toxin conjugates, comprising:

a diptheria toxin, or an enzymatic fragment of diptheria toxin;

and a spacer covalently linked to said diptheria toxin comprising an amino acid sequence which has the formula:

Gly-Thr-Gly-Ser-Gly-$(Pro)_6$-Ser-Gly-Ser-Gly-Thr-Cys.

4,894,444
RECOVERY AND PURIFICATION OF IMMUNOGENS FROM IMMUNOGEN-ALUM COMPLEXES

Edgar M. Scattergood, Lansdale, Pa., and Roy W. Grabner, Ballwin, Mo., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Jul. 16, 1987, Ser. No. 74,376
Int. Cl.[4] C07K 3/26, 3/28
U.S. Cl. 530—414 10 Claims

1. A process for recovering hepatitis B surface antigens from hepatitis B surface antigen alum complexes without altering the immunogenicity of the hepatitis B surface antigens which comprises the following steps:

a. dissolution of the hepatitis B surface antigen alum complex by treating the complexes with a concentration of from about 1% to about 5% of an alkali metal salt of a carboxylic acid, at a pH between about 8.9 and 9.5, at a temperature of from about 10° to about 27° C., for about 60 to about 240 minutes; followed by

b. sterilization;

c. concentration; and

d. purification.

4,894,445
METAL-ISONITRILE ADDUCTS FOR PREPARING RADIONUCLIDE COMPLEXES

Alan P. Carpenter, Jr., Tyngsboro; Leo J. Mahew, Andover; Michael A. Patz, Somerville, all of Mass.; Thomas H. Tulip, Nashua, N.H.; Karen E. Linder, Somerville, Mass.; Vinayakam Subramanyam, Towson, Md., and Jeffery S. Thompson, Wilmington, Del., assignors to E. I. Du Pont De Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 762,392, Aug. 5, 1985, abandoned. This application Jun. 25, 1986, Ser. No. 880,349
Int. Cl.[4] A61K 49/02; C07C 119/02; C07F 1/08, 9/00
U.S. Cl. 534—14 7 Claims

1. A method for preparing a coordination complex of an isonitrile ligand and a radioactive metal selected from the class

consisting of radioactive isotopes of Tc, Ru, Co, Pt, Fe, Os, Ir, W, Re, Cr, Mo, Mn, Ni, Rh, Pd, Nb and Ta, said method comprising admixing a lyophilized soluble copper adduct of said isonitrile ligand with a radioactive metal in a suitable solvent to replace said copper with the radioactive metal thereby forming said coordination complex.

4,894,446

VOLATILE LANTHANUM COMPLEXES AND THEIR USES

Frederick G. N. Cloke, Brighton, England, assignor to The British Petroleum Company p.l.c., London, England

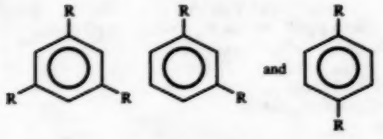
Filed Jun. 13, 1988, Ser. No. 206,208

Claims priority, application United Kingdom, Jun. 16, 1987, 8714072

Int. Cl.[4] C07F 5/00, 7/08; C07C 15/04; C23C 16/06

U.S. Cl. 534—15 **7 Claims**

1. Homoleptic bis (π-arene) yttrium or lanthanide complexes having the general formula ML_2 wherein M is yttrium or a lanthanide metal and the L ligands are independently selected from



wherein the R groups are independently selected from (a) C_3 to C_{20} hydrocarbyl radicals or (b) $Si(R^1)_3$ or $CH(Si(R^1)_3)_2$ groups wherein the R^1 groups are independently C_1 to C_{20} hydrocarbyl radicals.

4,894,447

SURFLONATED AZO DYES CONTAINING A DIAZO COMPONENT CONSISTING OF A TWO RING HETEROCYCLE WITH AN AMINOPHENYLENE GROUP

Jean-Marie Adam, Rosenau, France, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

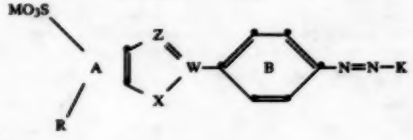
Filed Apr. 9, 1987, Ser. No. 36,416

Claims priority, application Switzerland, Apr. 16, 1986, 1521/86-3

Int. Cl.[4] C09B 29/033, 29/33, 29/50, 29/52

U.S. Cl. 534—775 **16 Claims**

1. An azo dye of the formula



(I)

or tautomeric forms thereof, in which:

Z is N or CH,

X is O,

W is C,

K is a coupling component,

R is hydrogen, C_1–C_6-alkyl, C_1–C_4-alkoxy, halogen, nitro, —CN, —NHR_1, —NH-acyl, phenoxy, —COOH, —$COOR_1$, —$CONHR_1$, phenyl or phenyl which is substituted by C_1–C_4-alkyl, C_1–C_4-alkoxy, halogen, nitro or sulfo; wherein acyl is C_2–C_6-alkanoyl, benzoyl or benzoyl which is substituted by C_1–C_4-alkyl, C_1–C_4-alkoxy, halogen, nitro or sulfo; R_1 being hydrogen, C_1–C_6-alkyl, C_1–C_6-alkyl which is substituted by OH, C_1–C_4-alkoxy or C_1–C_4-hydroxyalkoxy, phenyl or phenyl which is substituted by C_1–C_4-alkyl, C_1–C_4-alkoxy, halogen, nitro or sulfo,

M is $H^{\oplus}$, $Li^{\oplus}$, $Na^{\oplus}$, $K^{\oplus}$, $NH_4^{\oplus}$, or C_4–C_{12}-trialkylammonium, C_4–C_{12}-diammonium or C_2–C_{12}-alkanolammonium,

A is a benzene or pyridine ring which is unsubstituted or substituted by halogen, nitro, —CN, C_1–C_4-alkoxy or C_1–C_4-alkyl,

B is a 1,4-phenylene radical which is unsubstituted or substituted by sulfo, C_1–C_4-alkyl, C_1–C_4-alkoxy, halogen, nitro or —CN.

4,894,448

PROCESS FOR THE PREPARATION OF LOW-VISCOSITY CELLULOSE ETHERS

Heinz Pelzer, Oestrich-Winkel, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 901,297, Aug. 28, 1986, abandoned. This application Nov. 14, 1988, Ser. No. 271,347

Claims priority, application Fed. Rep. of Germany, Aug. 29, 1985, 3530857

Int. Cl.[4] C08G 18/34

U.S. Cl. 536—84 **9 Claims**

1. A process for the preparation of low-viscosity cellulose ethers, comprising the steps of:

subjecting cellulose to alkalization with an aqueous sodium hydroxide solution;

subsequently etherifying the alkalized cellulose; and

before said etherifying step, adding an aqueous sodium chlorite solution.

4,894,449

DIOSMIN OCTAKIS (HYDROGEN SULFATE) ALUMINUM COMPLEX

Aurelio O. Venero, Paseo del Puerto, 24 48990 Neguri, and Ramon M. Pestana, Avenida Iparraguirre, 20, 7° A, 48940 Lejona, both of Spain

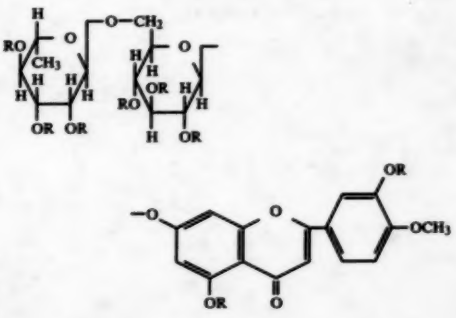
Filed Jul. 28, 1988, Ser. No. 225,544

Claims priority, application European Pat. Off., Jul. 7, 1987, 87.500.053.1; Spain, Jul. 7, 1987, 8702270

Int. Cl.[4] C07H 11/00, 15/00, 17/06, 15/24

U.S. Cl. 536—118 **1 Claim**

1. Diosmin octakis (hydrogen sulfate) aluminium complex, with molecular formula:



in which R represents

$SO_3Al_2(OH)_5$.

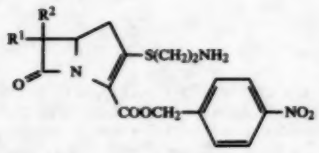
4,894,450

PROCESS FOR 2-(AMINOALKYLTHIO) CARBAPENEMS

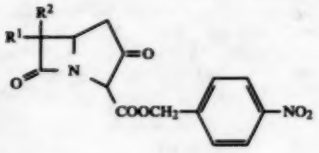
Edward J. J. Grabowski, Westfield, and David L. Hughes, Old Bridge, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed May 11, 1987, Ser. No. 48,341
Int. Cl.[4] C07D *487/04*
U.S. Cl. 540—350 **3 Claims**

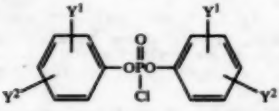
1. A process for preparing a compound of the formula



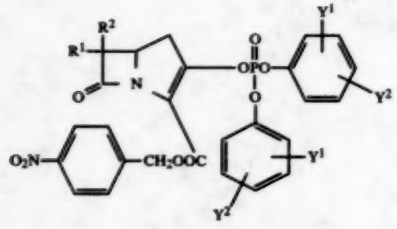
or a pharmaceutically acceptable acid addition salt thereof;
wherein one of R^1 or R^2 is hydrogen and the other of R^1 or R^2 is 1-hydroxyethyl; comprising:
(a) reacting a mixture of diisopropylethylamine and a compound of the formula



wherein R^1 and R^2 are defined as above; with a phosphorochloridate of the formula



wherein Y^1 is 4-chloro, Y^2 is hydrogen or 2-chloro; in N-ethylpyrrolidinone at a temperature of about −50° to form an enol phosphate intermediate of the formula



wherein R^1, R^2, Y^1, and Y^2 are defined as above; and
(b) adding to the enol phosphate intermediate cysteamine hydrochloride at a temperature of from about −70° to about −60°.

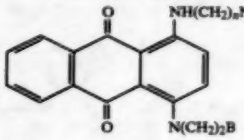
4,894,451

UNSYMMETRICAL 1,4-BIS(AMINOALKYLAMINO)-ANTHRACENE-9, 10-DIONES AND DERIVATIVES

A. Paul Krapcho, South Burlington; Miles P. Hacker, Williston, both of Vt.; John J. Landi, Jr., Cresco, Pa.; J. J. McCormack, Burlington, Vt., and Kenneth J. Shaw, Orangeburg, N.Y., assignors to The University of Vermont, Burlington, Vt.

Continuation of Ser. No. 718,103, Apr. 1, 1985, abandoned. This application Jul. 19, 1988, Ser. No. 222,360
Int. Cl.[4] C07C *87/64*; C07D *295/12*
U.S. Cl. 544—156 **11 Claims**

1. A compound having the formula



(I)

wherein:
B represents a radical selected from a dialkyl amino group having 1 to 4 carbons and a N-heterocyclic radical having 4, 5 or 6 carbon atoms,
n represents 3, 4 or 5, and
R represents alkanoyl or a non-toxic physiologically acceptable salt thereof.

4,894,452

CYANURIC ACID PRODUCTION BY CONTROLLED PYROLYSIS OF BIURET

Kurt F. Stephan, Wenatchee, Wash., assignor to Lenroc Company, Ephrata, Wash.

Filed Apr. 18, 1988, Ser. No. 182,504
Int. Cl.[4] C07D *251/32*
U.S. Cl. 544—192 **12 Claims**

1. A process in which urea is pyrolytically converted to cyanuric acid, said process comprising heating, in dry, particulate, and essentially solid state, a partially pyrolyzed reaction product containing less than about 40% urea by weight an at least from about 30% biuret by weight, the heating of such feedstock occurring while maintaining the particles in essentially solid phase and at a temperature substantially at or slightly below the softening temperature of the particles with forced hot gas flow interstitially through the particles for a sufficient time to increase the cyanuric acid content thereof until the reaction product is principally cyanuric acid, partly by conversion of urea to biuret and in turn by conversion of biuret to cyanuric acid.

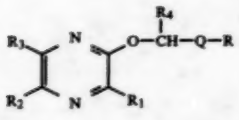
4,894,453

2-SUBSTITUTED ALKOXY-3-SUBSTITUTED-PYRAZINES

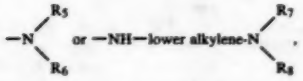
Masao Yaso; Yukio Suzuki; Kensuke Shibata; Daisuke Mochizuki, and Eiichi Hayashi, all of Shizuoka, Japan, assignors to Toyo Jozo Kabushiki Kaisha, Shizuoka, Japan

Filed Jun. 30, 1987, Ser. No. 68,228
Claims priority, application Japan, Jun. 30, 1986, 61-153742; Jun. 30, 1986, 61-153743
Int. Cl.[4] C07D *241/38, 241/18, 403/12*
U.S. Cl. 544—354 **4 Claims**

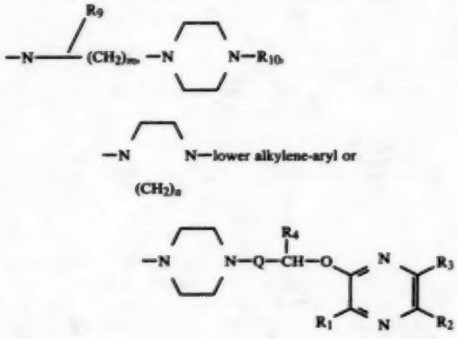
1. A compound of the formula



wherein Q is —CO— or —CH_2—, R is hydroxyl, lower alkoxy, halogen, -NH-lower alkylene-OH, -NH-lower alkylene-arylthio, -NH-lower alkylene-halogen,



is dilower alkylamino, cycloalkyl-amino, morpholino,



in which R_9 is hydrogen, lower alkyl or aryl, R_{10} is hydrogen, lower alkyl, hydroxy-lower alkyl, hydroxy-lower alkoxy-lower alkyl, aryl or di(aryl)-lower alkyl, m is an integer from 4 to 6, n is 2 or 3, R_1 is alkyl or aryl-lower alkyl, R_2 and R_3 together form tetramethylene, R_4 is hydrogen, lower alkyl or aryl, in which aryl is phenyl which is optionally substituted with a group selected from the group consisting of 1–3 halogen, nitro, lower alkyl and lower alkoxy, or a pharmaceutically acceptable salt thereof.

4,894,454

PHARMACEUTICAL PREPARATIONS

Henrich H. Parsdies, Iserlohn, Fed. Rep. of Germany, assignor to Medice Chem.-Pharm. Fabrik, Putter GmbH & Co., KG, Fed. Rep. of Germany

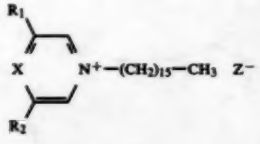
Filed Aug. 6, 1987, Ser. No. 82,773

Claims priority, application Fed. Rep. of Germany, Aug. 7, 1986, 3626700

Int. Cl.[4] C07D *241/19, 241/24*

U.S. Cl. 544—406 **2 Claims**

1. A compound having the formula



in which:

X is a member selected from the group consisting of N and N^+—$(CH_2)_n$—CH_3;

R_1 is a member selected from the group consisting of H, C(O)—O—$(CH_2)_n$—CH_3, and OH;

R_2 is a member selected from the group consisting of H, C(O)—O—$(CH_2)_n$—CH_3, C(O)—NH_2 and OH;

n is 8 to 20; and

Z^- is an anion selected from the group consisting of chloride, bromide, iodide, maleate, formate, acetate, propionate, HSO_4^-, malate, fumarate, salicylate, alginate, gluconate, glucoronate, galactoronate, ethyl sulfate and $H_2PO_4^-$.

4,894,455

PHARMACEUTICALLY ACTIVE ZINC COMPLEXES

Robert C. Hider, St. Osyth; George Kontoghiorghes; Jack Silver, both of London, and Michael A. Stockham, Saffron Walden, all of England, assignors to National Research Development Corporation, London, England

Division of Ser. No. 666,905, Oct. 31, 1984, Pat. No. 4,665,064. This application Feb. 18, 1987, Ser. No. 16,083

Claims priority, application United Kingdom, Oct. 31, 1983, 8329043

Int. Cl.[4] C07F *9/80*

U.S. Cl. 546—2 **39 Claims**

1. A zinc(II) complex in which each ligand is provided by the same or a different compound selected from the group consisting of:

(1) 3-hydroxy-4-pyrone and a 3-hydroxy-4-pyrone in which one or more of the hydrogen atoms attached to ring carbon atoms are replaced by an aliphatic hydrocarbon group of 1 to 6 carbon atoms;

(2) a 3-hydroxypyrid-2-one in which the hydrogen atom attached to the nitrogen atom is replaced by an aliphatic acyl group, by an aliphatic hydrocarbon group of 1 to 6 carbon atoms, or by an aliphatic hydrocarbon group substituted by one or more substituents selected from aliphatic acyl, alkoxy, aliphatic amide, aliphatic ester, halogen and hydroxy groups and in which one or more of the hydrogen atoms attached to ring carbon atoms may be replaced by one of said substituents, by an aliphatic hydrocarbon group of 1 to 6 carbon atoms, or by an aliphatic hydrocarbon group substituted by an alkoxy, aliphatic ester, halogen or hydroxy group; and

(3) an alternative compound providing a physiologically acceptable, monobasic, bidentate ligand which is capable of bonding covalently to zinc and which (a) contains a first grouping which is an enolic hydroxy group or a carboxy group and a second grouping which is an amine group or a hydroxy group, (b) is a monocarboxylic acid providing an anion containing a group

or (c) is a 3-hydroxypyrid-4-one in which the hydrogen atom attached to the nitrogen atom is replaced by an aliphatic acyl group, by an aliphatic hydrocarbon group of 1 to 6 carbon atoms, or by an aliphatic hydrocarbon group substituted by one or more substituents selected from aliphatic acyl, alkoxy, aliphatic amide, aliphatic ester, halogen and hydroxy groups and in which one or more of the hydrogen atoms attached to ring carbon atoms may be replaced by one of said substituents, by an aliphatic hydrocarbon group of 1 to 6 carbon atoms, or by an aliphatic hydrocarbon group substituted by an alkoxy, aliphatic ester, halogen or hydroxy group; but with the proviso that at least one ligand is of type (1) or (2) and excluding complexes in which the ligand is provided by a compound, or each ligand is provided by the same com-

pound, which is 3-hydroxy-4-pyrone, 3-hydroxy-2-methyl-4-pyrone or 3-hydroxy-6-methyl-4-pyrone.

4,894,456

SYNTHESIS OF CAMPTOTHECIN AND ANALOGS THEREOF

Monroe E. Wall, Chapel Hill; Mansukh C. Wani, Durham; Allan W. Nicholas, and Govindarajan Manikumar, both of Raleigh, all of N.C., assignors to Research Triangle Institute, Research Triangle Park, N.C.

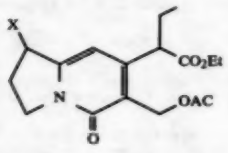
Filed Mar. 31, 1987, Ser. No. 32,449

Int. Cl.[4] A61K *31/47*; C07D *491/147*, *491/22*

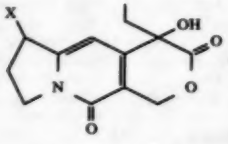
U.S. Cl. 546—41 **12 Claims**

1. A method for synthesizing camptothecin and analogs thereof, comprising the steps of:

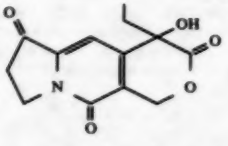
cyclizing a compound of the formula shown below, wherein X is an organic group which is converted to a carbonyl group when treated with an acid; in the presence of a basic catalyst, and a source of oxygen,



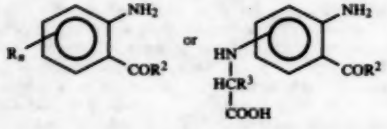
to form a lactone having the formula



deprotecting said lactone to form a hydroxyl-containing tricyclic compound having the formula shown below, and



reacting said hydroxyl-containing tricyclic compound in the presence of an acid or base catalyst, with a substituted ortho-amino compound of the formula



wherein n=1–2 and wherein each R is selected from the group consisting of cyano, methylenedioxy, formyl, hydroxy, C_{1-8} alkoxy, nitro, amino, chloro, bromo, iodo, fluoro, C_{1-8} alkyl, trifluoromethyl, aminomethyl, amido, azido and hydrazino groups; R^2 is H or C_{1-8} alkyl; and R^3 is the side-chain of any of the twenty naturally occurring amino acids.

12. The compound 10,11-methylenedioxy-20(RS)camptothecin.

4,894,457

7-BROMO-BETA-CARBOLINE COMPOUND AND METHOD FOR PRODUCING SAME

Masaaki Kubo, Sayama; Hiroshi Umezawa, and Kazuhiro Okura, both of Kawagoe, all of Japan, assignors to Kawaken Fine Chemicals Co., Ltd., Tokyo, Japan

Filed Dec. 21, 1987, Ser. No. 135,392

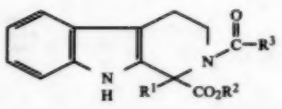
Claims priority, application Japan, Dec. 25, 1986, 61-310496

Int. Cl.[4] C07D *471/04*

U.S. Cl. 546—85 **9 Claims**

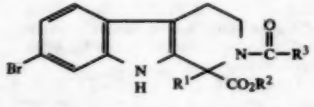
1. A method for producing a 7-bromo-β-carboline compound comprising the steps of:

(A) reacting a β-carboline compound of the formula (II):



(II)

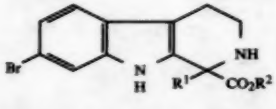
wherein R^1 represents a member selected from the group consisting of a hydrogen atom and alkyl radicals having 1 to 5 carbon atoms, R^2 represents a member selected from the group consisting of alkyl radicals having 1 to 5 carbon atoms and a benzyl radical, and R^3 represents a member selected from the group consisting of a hydrogen atom, alkyl radicals having 1 to 5 carbon atoms, alkoxy radicals having 1 to 5 carbon atoms and a benzyloxy radical, with a brominating agent selected from the group consisting of bromine and N-bromosuccinimide, in an amount of 0.8 to 1.5 molar equivalent weight per molar equivalent weight of the β- carboline compound of the formula (II), in an organic solvent in the presence of an alkali at a temperature lower than the boiling point of the organic solvent, to prepare a precursory 7-bromo-β-carboline compound of the formula (II):



(III)

wherein R^1, R^2 and R^3 are as defined above; and

(B) hydrolyzing the precursory compound of the formula (III) in a solvent in the presence of a mineral acid at a temperature of 80° C. or less, to provide a 7-bromo-β-carboline compound of the formula (I):



(I)

wherein R^1 and R^2 are as defined above.

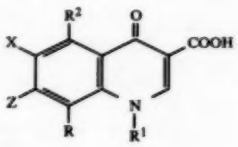
4,894,458

QUINOLONECARBOXYLIC ACID DERIVATIVES AND THEIR PREPARATION

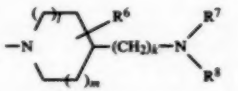
Kuniyoshi Masuzawa, Koga; Seigo Suzue; Keiji Hirai, both of Kuki, and Takayoshi Ishizaki, Washimiya, all of Japan, assignors to Kyorin Pharmaceutical Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 26,194, Mar. 16, 1987, abandoned. This application Aug. 18, 1988, Ser. No. 233,363
Claims priority, application Japan, Mar. 17, 1986, 61-59016
Int. Cl.[4] C07D *401/04*
U.S. Cl. 546—156 8 Claims

1. A compound of the formula:



wherein R indicates straight or branched lower alkyl, R^1 indicates cycloalkyl having 3 to 6 carbon atoms, straight or branched lower alkyl, halogenalkyl, alkenyl, hydroxyalkyl, lower alkylamino or phenyl, R^2 indicates hydrogen, halogen, nitro or amino, X indicates halogen, Z indicates pyrrolidino or piperidino of the following formula:



wherein k is 0, 1 or 2, l is 0 or 1 or 2, m is 0 or 1, R^6 indicates hydrogen, lower alkyl or hydroxy, R^7 indicates hydrogen, lower alkyl, halogenoalkyl or hydroxyalkyl, R^8 indicates hydrogen, lower alkyl, lower acyl, alkoxycarbonyl or benzyl; and the hydrates and pharmaceutically acceptable acid addition or alkali salts thereof.

4,894,459

PROCESS FOR THE PREPARATION OF MORPHOLOGICALLY HOMOGENEOUS FORMS OF THIAZOLE DERIVATIVES

Péter Bod, Gyönrö; Kálmán Harsányi, Budapest; Béla Hegedüs, Budapest; Erik Bogsch, Budapest; Éva Fekecs, Budapest; Imre Péter, Budapest; Zsuzsanna Aracs né Trischler, Budapest; Sándor Miszori, Budapest, and Mária Stiller, Budapest, all of Hungary, assignors to Richter Gedeon Vehyeszeti Gyar Rt., Budapest, Hungary

Filed Aug. 4, 1987, Ser. No. 81,423
Claims priority, application Hungary, Aug. 5, 1986, 3370/86
Int. Cl.[4] C07D *277/42*
U.S. Cl. 548—197 4 Claims

1. A process for preparation of morphologically homogeneous Famotidine [chemical name: N-sulfamoyl-3-(2-guanidinothiazole-4-yl-methylthio)-propionamidine], characterized by dissolving Famotidine of optional morphological composition in water and/or a lower aliphatic alcohol under heating and

(a) in the case of the preparation of the form "A" the hot-saturated solution is crystallized by using a cooling rate of about 1° C./min or less, or

(b) in the case of the preparation of the form "B" the product is precipitated from its oversaturated solution, which was oversaturated at a temperature lower than 40° C.,

and in both cases the required product is separated from the obtained suspension of crystals.

4,894,460

BASIC ESTERS EXHIBITING AN ANTAGONISTIC ACTIVITY TO CALCIUM, PROCESS FOR THE PREPARATION THEREOF AND PHARMACEUTICAL COMPOSITIONS THEREFROM

Silvia Z. Tricerri, Carimate; Cesare Casagrande, Arese; Franco de Marchi, Milan, and Massimo Nicola, Pavia, all of Italy, assignors to Pierrel S.p.A., Napoli, Italy

Continuation-in-part of Ser. No. 498,247, May 26, 1983, abandoned. This application Dec. 19, 1983, Ser. No. 563,008
Claims priority, application Italy, Jun. 3, 1982, 21678 A/82; May 11, 1983, 21043 A/83
Int. Cl.[4] C07D *401/00*
U.S. Cl. 544—331 2 Claims

1. The compound 2[4-(2-thiazolyl)]piperazino-ethyl 2,6-dimethyl-4-(3-nitrophenyl)-5-methoxycarbonyl-1,4-dihydropyridine-3-carboxylate.

4,894,461

3-(γ-CHLOROPROPYL)-6-FLUORO-1,2-BENZISOXAZOLE

Larry Davis, Sergeantsville, and Richard C. Effland, Bridgewater, both of N.J., assignors to Hoechst-Roussel Pharmaceuticals, Inc., Somerville, N.J.

Continuation of Ser. No. 257,698, Apr. 27, 1981, abandoned. This application Feb. 27, 1986, Ser. No. 833,587
Int. Cl.[4] C07D *31/42*
U.S. Cl. 548—241 1 Claim

1. The compound 3-(γ-chloropropyl)-6-fluoro-1,2-benzisoxazole.

4,894,462

PREPARATION OF SPHEROIDAL 3-NITRO-1,2,4-TRIAZOLE-5-ONE

Steven L. Collignon, Waldorf, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jun. 24, 1988, Ser. No. 213,037
Int. Cl.[4] C07D *249/12*
U.S. Cl. 548—265 6 Claims

1. A process for producing spheroidal crystals of 3-nitro-1,2,4-triazol-5-one comprising the following steps in order:

(1) completely dissolving 3-nitro-1,2,4-triazol-5-one in a low molecular weight alcohol of from 1 to 5 carbon atoms at a temperature of from 40° C. up to just below the boiling point of the alcohol at ambient pressure;

(2) cooling the 3-nitro-1,2,4-triazol-one/alcohol solution at a rate of from 6° C./minute to 20° C./minute while the solution is agitated until the solution is at a temperature in the range of from −10° C. to +5° C.; and

(3) isolating the product spheroidal crystals of 3-nitro-1,2,4-triazol-5-one.

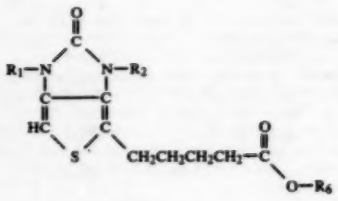
4,894,463

PROCESS FOR PREPARING THIOPHENE DERIVATIVES

Holger Blum, Parkalee 75, 2000 Hamburg 13, Fed. Rep. of Germany

Filed Aug. 16, 1988, Ser. No. 232,678
Claims priority, application Fed. Rep. of Germany, Aug. 17, 1987, 3727428; European Pat. Off., Sep. 15, 1987, 87113493.8
Int. Cl.[4] C07D *235/00*
U.S. Cl. 548—303 4 Claims

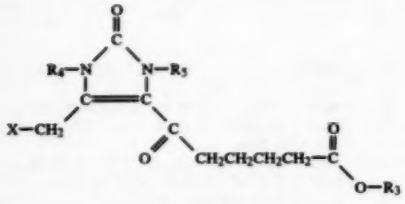
1. A process for preparing thiophene derivatives of the general formula



I

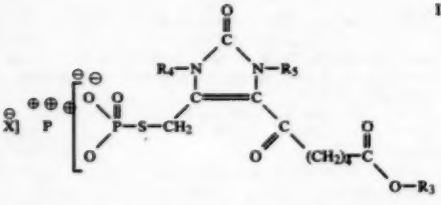
wherein R_1 and R_2, which may be the same or different, are each hydrogen or lower acyl, and R_6 is hydrogen or lower alkyl, characterized by

(a) reacting a compound of the general formula



II

wherein R_3 is lower alkyl, R_4 and R_5 are lower acyl and X is chlorine, bromine or iodine, with a strong basic quaternary ammonium anion exchange resin in the monothiophosphate form to form a polymer compound of the general formula



III

wherein R_3, R_4 and R_5 have the above significance and $(P)^{+++}$ represents a polymer cation,

(b) separating the polymer intermediate product of formula (III) obtained in step (a) from non-reacted accompanying substances by washing with a washing liquid capable of dissolving the accompanying substances, and then

(c) reacting the washed polymer intermediate product of formula (III) in an acidic medium to form the thiophene derivative of formula (I).

4,894,464

BRANCHED AMIDES OF L-ASPARTYL-D-AMINO ACID DIPEPTIDES

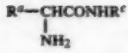
Thomas M. Brennan, and Michael E. Hendrick, both of Groton, Conn., assignors to Pfizer Inc., New York, N.Y.

Division of Ser. No. 796,173, Nov. 8, 1985, Pat. No. 4,804,782, which is a division of Ser. No. 496,428, May 20, 1983, abandoned, which is a division of Ser. No. 201,745, Nov. 5, 1980, Pat. No. 4,411,925, which is a continuation-in-part of Ser. No. 113,800, Jan. 21, 1980, abandoned. This application Oct. 26, 1988, Ser. No. 262,627

Int. Cl.[4] C07D *331/04, 333/36, 335/02*

U.S. Cl. 549—88 **3 Claims**

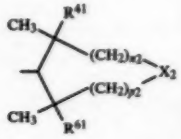
1. A D-amino acid amide compound of the formula



wherein

R^a is methyl, ethyl, isopropyl or n-propyl and

R^c is a



where n_2 and p_2 are each 0 or 1 and

when n_2 and p_2 are each zero: R^{41} and R^{61} are each methyl and X_2 is S, or SO_2,

when n_2 is zero and p_2 is 1: R^{41} and R^{61} are each methyl and X_2 is S or SO_2, and

when n_2 is 1 and p_2 is 1: R^{41} and R^{61} are each hydrogen and X_2 is S or SO_2.

4,894,465

INTERMEDIATES AND PROCESSES FOR 6-HYDROXYMETHYL HMG-COA REDUCTABLE INHIBITORS

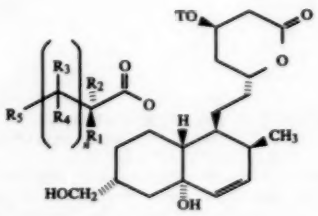
Ta J. Lee, and William F. Hoffman, both of Lansdale, Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Feb. 29, 1988, Ser. No. 161,530

Int. Cl.[4] C07D *309/30*

U.S. Cl. 549—214 **4 Claims**

1. A compound of structural formula (H):



(H)

wherein

n is 0 to 3;

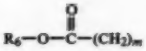
R_1 and R_2 independently are hydrogen, C_{1-5}alkyl, or R_1 and R_2 together with the carbon atom to which they are attached form a carbocyclic ring of 3 to 8 carbon atoms;

R_3 and R_4 are independently hydrogen, C_{1-3} alkyl, C_{3-7} cycloalkyl, C_{1-3} alkylthio, phenyl, phenylthio or substituted phenyl in which the substituents are V and W and when n is 2 to 3, each of the R_3s and R_4s are independently hydrogen, C_{1-3} alkyl, C_{3-7} cycloalkyl or only one of the R_3s or R_4s on the chain of carbons is phenyl or substituted phenyl;

R_5 is hydrogen, tosylate, OT, C_{1-5}alkyl or C_{1-5}alkyl substituted with tosylate or OT, or C_{3-7}cycloalkyl or C_{3-7}cycloalkyl; substituted with C_{1-3}alkyl, tosylate or OT, C_{2-5} alkenyl, phenyl or substituted phenyl in which the substituents are V and W, or R_5 in a group selected from:

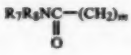
(a) C_{1-5}-alkanoyloxy-C_{1-4}-alkyl,

(b)



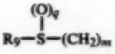
in which m is 0 to 3 and R_6 is C_{1-5} alkyl;

(c)



in which R_7 and R_8 are independently C_{1-5} alkyl or R_7 and R_8 together with the nitrogen atom to which they are attached form a heterocycle selected from piperidinyl, morpholinyl, pyrrolidinyl, piperazinyl or thiomorpholinyl;

(d)



in which q is 0 to 2 and R_9 is C_{1-5}alkyl or phenyl or substituted phenyl in TO-C_{1-3}alkyl which the substituents are V and W;

V and W independently are hydrogen, halogen, hydroxy, trifluoromethyl, C_{1-3}alkyl, C_{1-3}alkyloxy and TO-C_{1-3}alkyl;

T is tert-butyldimethylsilyl, tert-butyldiphenylsilyl, trimethylsilyl, triethylsilyl, triisopropylsilyl or tetrahydropyranyl.

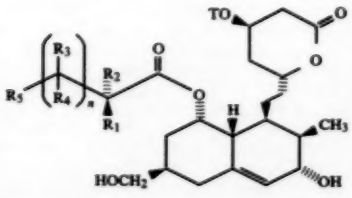
4,894,466

INTERMEDIATES AND PROCESSES FOR β-6-HYDROXYMETHYL HMG-COA REDUCTABLE INHIBITORS

Ta Jyh Lee, and William F. Hoffman, both of Lansdale, Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Feb. 29, 1988, Ser. No. 161,529
Int. Cl.[4] C07D *309/30*
U.S. Cl. 549—292 **4 Claims**

1. A compound of structural formula (9):



(9)

wherein:

n is 0 to 3;

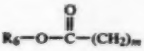
R_1 and R_2 independently are hydrogen, C_{1-5} alkyl, or R_1 and R_2 together with the carbon atom to which they are attached form a carbocyclic ring of 3 to 8 carbon atoms;

R_3 and R_4 are independently hydrogen, C_{1-3} alkyl, C_{3-7} cycloalkyl, C_{1-3} alkylthio, phenyl, phenylthio or substituted phenyl in which the substituents are V and W and when n is 2 to 3, each of the R_3s and R_4s are independently hydrogen. C_{1-3} alkyl, C_{3-7} cycloalkyl or only one of the Rs and R_4s is phenyl or substituted phenyl;

R_5 is hydrogen, tosylate, OT, C_{1-5}alkyl or C_{1-5}alkyl substituted with tosylate or OT, or C_{3-7}cycloalkyl or C_{3-7}-cycloalkyl substituted with C_{1-3}alkyl, tosylate, or OT, C_{2-5} alkenyl, phenyl or substituted phenyl in which the substituents are V and W, or R_5 is a group selected from:

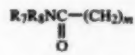
(a) C_{1-5}-alkanoyloxy-C_{1-4}-alkyl,

(b)



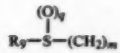
in which m is 0 to 3 and R_6 is C_{1-5} alkyl;

(c)



in which R_7 and R_8 are independently C_{1-5} alkyl or R_7 and R_8 together with the nitrogen atom to which they are attached form a heterocycle selected from piperidinyl, morpholinyl, pyrrolidinyl, piperazinyl or thiomorpholinyl;

(d)



in which q is 0 to 2 and R_9 is C_{1-5} alkyl or phenyl or substituted phenyl in which the substituents are V and W;

V and W independently are hydrogen, halogen, hydroxy, trifluoromethyl, C_{1-3} alkyl, C_{1-3} alkyloxy and TO-C_{1-3} alkyl;

T is tert-butyldimethylsilyl, tert-butyldiphenylsilyl, trimethylsilyl, triethylsilyl, triisopropylsilyl or tetrahydropyranyl.

4,894,467

VAPOR PHASE OXIDATION OR STYRENE TO STYRENE OXIDE

Patricia R. Blum, Macedonia, Ohio, assignor to The Standard Oil Company, Cleveland, Ohio

Filed Oct. 16, 1986, Ser. No. 919,722
Int. Cl.[4] C07B *301/10*
U.S. Cl. 549—534 **7 Claims**

1. A process for making styrene oxide which comprises contacting styrene in the vapor phase with a molecular oxygen-containing gas over a silver metal catalyst containing a promoting amount of at least one alkali metal hydroxide selected from sodium, potassium and lithium hydroxides, on an inert solid inorganic support at contact times of from 0.6 to 10 seconds and temperatures from 200° to 350° C.

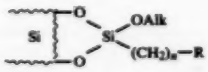
4,894,468

SUBSTITUTED SILICA

Meir Wilchek, and Karin Cabrera, both of Rehovot, Israel, assignors to Yeda Research and Development Co., Ltd., Rehovot, Israel

Filed May 1, 1987, Ser. No. 44,475
Claims priority, application Israel, Apr. 27, 1986, 78678
Int. Cl.[4] C07F *7/08*
U.S. Cl. 556—416 **10 Claims**

1. A compound of the general formula



wherein:

Alk is lower alkyl and Si is silica, and where:

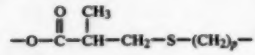
a. the compound is a primary hydroxy silica compound, wherein R is hydroxyl or R is $-(CH_2)_n-O-(CH_2)_m-CH_2-OH$,

b. a derivative thereof wherein:

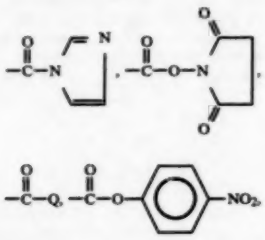
R is $-O-(CH_2)_m-R^1-OR^2$,

R^1 is a group selected from:

$-CH_2-$, $-O-CH_2-$, $-O-CH_2-CH_2-$,



R^2 is selected from: hydrogen, $-CN$, $-SO_2CH_2-CF_3$,



where Q is a group $-HN-(CH_2)_n-NH_2$, $-HN-(CH_2)_n-COOH$, —HN—peptide or —HN—protein, where n, m and p are small integers, where m may also be zero.

4,894,469

PROCESS FOR MAKING HALOGENATED PHOSPHONOPHOSPHORIC ACID-ESTERS AND THEIR USE

Horst Staendeke, Lohmar, and Werner Krause, Hürth, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

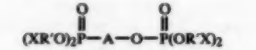
Filed Dec. 4, 1987, Ser. No. 128,805

Claims priority, application Fed. Rep. of Germany, Dec. 20, 1986, 3643684

Int. Cl.[4] C07F 9/20

U.S. Cl. 558—90 9 Claims

1. A process for making halogenated phosphonophosphoric acid esters of the general formula:



in which

X stands for a halogen

R' stands for an alkylene having from 1 to 4 carbon atoms

A stands for $>C=CR_2''''$

R'''' stands for identical or different alkyl groups having from 1 to 4 carbon atoms, a halogen or hydrogen

comprising the steps of:

(a) reacting phosphorus (III) chloride with alkylene oxide in the presence of a catalyst at a temperature between −20° and +20° C. and a reaction period between 0.5 and 5 hours;

(b) freeing the resulting reaction product consisting substantially of phosphorous acid trialkylester from alkylene oxide in excess;

(c) reacting the said reaction product with a halogenoacyl halide having from 2 to 6 carbon atoms in a molar ratio of 2:(1–1.5) at a temperature between 0° and 100° C. and a reaction period between 0.5 and 5 hours;

(d) repeatedly scrubbing the resulting phosphonophosphoric acid ester with an aqueous medium; and

(e) separating said phosphonophosphoric acid ester in a distillation step.

4,894,470

PROCESS FOR THE PREPARATION OF DIALKYL VINYLPHOSPHONATES

Günter Roscher, Kelkheim; Hans-Jerg Kleiner, Kronberg/Taunus; Gabriele Ihl, Frankfurt am Main, and Hermann Leipe, Kelkheim, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Mar. 3, 1988, Ser. No. 163,797

Claims priority, application Fed. Rep. of Germany, Mar. 6, 1987, 3707149

Int. Cl.[4] C07F 9/40

U.S. Cl. 558—142 20 Claims

1. A process for the production of dialkyl esters of vinyl phosphonic acid which comprises subjecting dialkyl esters of 2-acetoxyethane phosphonic acid to cleavage by contacting with an acidic liquid catalytically acting medium at a temperature in the range from 150°to 270° C. and under a pressure such that the partial pressures of the total of the components of the reaction system is in the range from 1 to 500 mbar, and drawing off the resulting dialkyl esters of vinyl phosphonic acid and other volatile reactions products.

4,894,471

CONTINUOUS PROCESS FOR THE ALKYLATION OF CH-ACID COMPOUNDS WITH ALKYL CARBONATES IN GAS-LIQUID PHASE TRANSFER CATALYSIS-CONDITIONS

Enrico Angeletti; Franco Trotta; Pietro Tundo, and Paolo Venturello, all of Turin, Italy, assignors to Consiglio Nazionale Delle Richerche, Rome, Italy

Filed Mar. 30, 1987, Ser. No. 31,598

Claims priority, application Italy, Apr. 3, 1986, 19971 A/86

Int. Cl.[4] C07C 121/66, 121/68

U.S. Cl. 558—378 8 Claims

1. A continuous process for the monoalkylation of a CH-acid compound selected from (1) an arylacetonitrile in which the aryl is, 6-methoxy-2-naphthyl, phenyl, p-isobutylphenyl, 3-phenoxy-phenyl, 3-fluoro-4-phenyl-phenyl, and 3-chloro-4-cyclohexyl phenyl and (2) methyl or ethyl malonic acid diester, which comprises introducing a liquid mixture of said CH-acid compound and a C_1–C_4 dialkyl carbonate in a compound/carbonate molar ratio of 1:1–60 into a vapor phase reaction zone maintained at a temperature of 120°–250° C. and a pressure of 0.01–5 bar and containing a catalyst bed comprising (a) a base selected from an alkali or alkaline earth metal carbonate, bicarbonate or hydroxide, (b) a phase transfer catalyst selected from polyalkylene glycols and block or random copolyalkylene glycols, condensation products of ethylene oxide and propylene oxide, and polyamides and copolyamides, and (c) an inert catalyst support comprising alumina in particulate form; the flow of said liquid mixture into said reaction zone being at a rate of 5–50ml.hr of mixture per 100 g of catalyst bed; and recovering the monalkylated CH-acid product by condensing the resultant reaction products.

4,894,472

DICYANOETHYLARYL DERIVATIVES AND PROCESS FOR THEIR PREPARATION

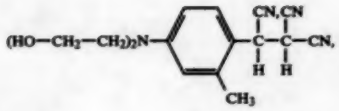
Florin Seng, Gladbach, and Klaus Wehling, Wuppertal, both of Fed. Rep. of Germany, assignors to Miles Inc., Elkhart, Ind.

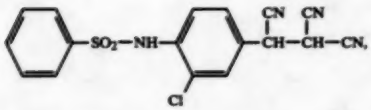
Filed Mar. 21, 1988, Ser. No. 170,754

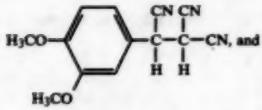
Int. Cl.[4] C07C 121/66; C12Q 1/28

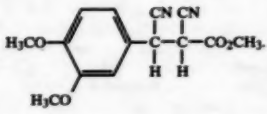
U.S. Cl. 558—405 2 Claims

1. A compound selected from the group consisting of









4,894,473
PROCESS FOR PREPARING 7-(2-HEXYL-5-HYDROXY-CYCLOPENTYL)-HEPTANOIC ACID

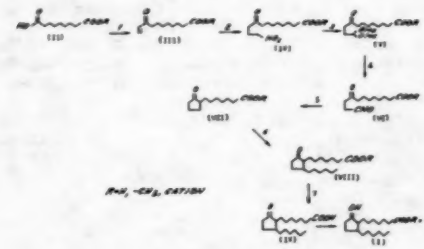
Umberto Valcavi, Milan; Sergio Innocenti, Melegnano; Enrico Bosone, Milan; Paolo Farina, Milan; Vittorio Marotta, Milan, and Gianbattista Zabban, Milan, all of Italy, assignors to Istituto Biochimico Italiano Giovanni Lorenzini S.p.A., Italy

Continuation of Ser. No. 744,406, Jun. 13, 1985, abandoned. This application Nov. 5, 1987, Ser. No. 117,669

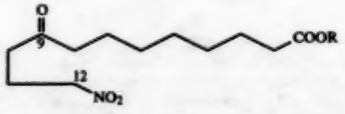
Claims priority, application Italy, Jan. 5, 1984, 19043 A/84; European Pat. Off., Dec. 15, 1984, 84115548; Japan, Jun. 27, 1985, 60-139202

Int. Cl.[4] C07C *177/00*

U.S. Cl. 560—156 11 Claims



1. A compound having the formula



(IV)

wherein R = H, CH_3, C_2H_5, C_3H_7 or C_4H_9.

4. The process of claim 3 wherein the hydrolysis step (e) is effected with hydrochloric acid.

4,894,474
PREPARATION OF ALKYL PENTENOATES

Robert Maerki, Fussgoenheim; Werner Bertleff, Viernheim; Hans J. Wilfinger, Schifferstadt; Gunter Schuch, Ludwigshafen; Wolfgang Harder, Weinheim; Gebhard Kuchn, Ludwigshafen, and Paul Panitz, Worms, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jul. 29, 1988, Ser. No. 225,823

Claims priority, application Fed. Rep. of Germany, Jul. 30, 1987, 3725241

Int. Cl.[4] C07C *67/36*

U.S. Cl. 560—206 20 Claims

1. A process for preparing an alkyl pentenoate, comprising: reacting butadiene with carbon monoxide and an alkanol in the presence of a cobalt carbonyl complex and a tertiary aromatic heterocyclic nitrogen base at from 80° to 160° C. under from 100 to 1,000 bar in the presence of from 0.1 to 10% by volume of hydrogen, based on the amount of carbon monoxide used.

4,894,475
ALPHA-ACYLOXYKETONE DERIVATIVES

Hiroaki Tan, Ohtake; Koji Kato, Waki; Junichi Imuta, Ohtake, and Noriaki Kihara, Iwakuni, all of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

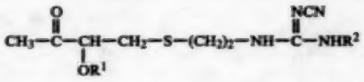
Filed Dec. 28, 1987, Ser. No. 138,876

Claims priority, application Japan, Dec. 26, 1986, 61-308538

Int. Cl.[4] C07C *149/437, 149/243*

U.S. Cl. 560—251 7 Claims

1. An alpha-acyloxyketone derivative represented by the formula (I)



(I)

wherein R^1 represents a lower aliphatic acyl group, and R^2 represents a lower alkyl group having 1–4 carbon atoms.

4,894,476
GABAPENTIN MONOHYDRATE AND A PROCESS FOR PRODUCING THE SAME

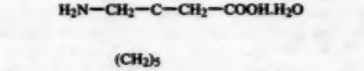
Donald E. Butler, Holland, and Barbara J. Greenman, Door, both of Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed May 2, 1988, Ser. No. 188,819

Int. Cl.[4] C07C *101/14*

U.S. Cl. 562—504 2 Claims

1.



II

exhibiting essentially the following X-ray diffraction data:

Spacing 'd'	Relative Intensities
14.255	99
7.196	99
5.438	4
4.848	99
4.575	7
4.291	7
3.633	99
3.376	21
3.220	9
2.903	28
2.771	23
2.356	7

-continued

Spacing 'd'	Relative Intensities
2.344	12

4,894,477

PROCESS FOR REGENERATING A CARBONYLATION CATALYST SOLUTION TO REMOVE CORROSION METALS AND CARBONYLATION OF METHANOL TO ACETIC ACID

Mark O. Scates, Pearland; G. P. Torrence, Corpus Christi, and Ronny G. Wood, Houston, all of Tex., assignors to Hoechst Celanese Corporation, Somnerville, N.J.

Filed Oct. 14, 1986, Ser. No. 918,740
Int. Cl.[4] C07C 51/12, 53/08, 51/47
U.S. Cl. 562—519 18 Claims

1. A process for the regeneration of carbonylation catalyst solutions containing rhodium and lithium and further containing corrosion metal contaminants which comprises intimately contacting said catalyst solution with a cation exchange resin in the lithium form and recovering a catalyst solution of reduced metal contaminant content.

10. In a process for the carbonylation of methanol to acetic acid in a carbonylation reactor by passing carbon monoxide through a reaction medium contained in said reactor and comprising methanol and a catalyst solution of low water content comprising rhodium, a methyl iodide promoter, methyl acetate and lithium iodide to produce acetic acid and said acetic acid is recovered from the effluent of said reactor by concentrating the effluent into a variety of process streams comprising one or more of the components of said catalyst solution and product acetic acid wherein said streams contain lithium and corrosion metal contaminants, the improvement comprising: removing said metal contaminants from at least one of said process streams by intimately contacting said stream with a cation exchange resin in the lithium form and recovering a process stream of substantially reduced metal contaminant content.

4,894,478

PROCESS OF PRODUCING KETOXIMES

Paolo Roffia, Saronno; Giuseppe Paparatto, Cinisello Balsamo; Alberto Cesana, Carate Brianz, and Giorgio Tauszik, Milan, all of Italy, assignors to Montedipe S.p.A., Milan, Italy

Filed Jul. 25, 1988, Ser. No. 223,403
Claims priority, application Italy, Jul. 29, 1987, 21493 A/87
Int. Cl.[4] C07C 131/04
U.S. Cl. 564—267 14 Claims

1. A process for the manufacture of cyclohexanone-oxime characterized in that:

(a) cyclohexanol is subjected to a partial low-temperature oxidation in the liquid phase, by means of oxygen or an oxygen-containing gas, an oxidized mixture being thereby formed which contains an excess of unreacted cyclohexanol, the ketone corresponding to said cyclohexanol, hydrogen peroxide, and organic compounds having a hydroperoxidic and/or peroxidic structure; and

(b) directly reacting said oxidized mixture with ammonia in the liquid phase, in the presence of an ammoximation catalyst consisting essentially of a titanium-silicalite, the oxidation temperature being from 50° to 150° C.

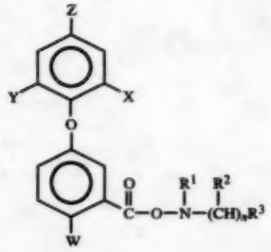
4,894,479

HERBICIDAL DIPHENYL ETHERS

John W. Ashmore, North Wales, and Ted Fujimoto, Churchville, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Filed Jun. 1, 1981, Ser. No. 269,224
Int. Cl.[4] C07L 53/00
U.S. Cl. 564—300 11 Claims

1. A compound of the formula



wherein X is hydrogen, halo, trihalomethyl, alkyl, nitro or cyano; Y is hydrogen or halo; Z is halo, trihalomethyl-or pentahaloethyl; W is nitro, cyano, halo or a radical of the formula: $S(O)_{n'}R$ wherein R is lower alkyl or trihaloalkyl; n' has a value of from 0 to 2; R^1 is hydrogen or a substituted or unsubstituted, saturated or unsaturated hydrocarbyl radical; R^2 is hydrogen or lower aikyl; n has a value of 0 to 3; R^3 is alkoxycarbonyl, alkylcarbonyl, aminocarbonyl, mononuclear aryloxy or carboxy including agronomically acceptable amides, esters or salts thereof or R^1 and R^2 may be joined together with the nitrogen to which they are attached to form a heterocyclic ring containing one nitrogen atom and from 4 to 8 nuclear carbon atoms.

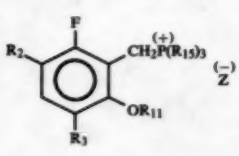
4,894,480

PHENYL SUBSTITUTED-2,4,6,8-NONATETRAENOIC ACID

Edward R. Aig, Fair Lawn; John W. Coffey; Allen J. Lovey, both of West Caldwell, and Michael Rosenberger, Caldwell, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 79,974, Jul. 31, 1987, abandoned, which is a division of Ser. No. 922,430, Oct. 23, 1986, Pat. No. 4,780,251, which is a division of Ser. No. 746,812, Jun. 20, 1985, Pat. No. 4,648,996, which is a continuation-in-part of Ser. No. 635,100, Jul. 27, 1984, abandoned. This application Dec. 16, 1988, Ser. No. 285,258
Int. Cl.[4] C07F 9/02
U.S. Cl. 568—11 2 Claims

1. A compound of the formula:



wherein R_{15} is aryl; Z is a halide ion, R_2 is chlorine, fluorine, trifluoromethyl, loweralkoxy, trifluoromethylloweralkoxy, hydroxy or hydroxy protected with a hydrolizable ester group or hydrogen; R_3 is hydrogen, lower alkyl or chlorine or fluorine R_{11} is an alkyl group containing 8 to 10 carbon atoms or $—CH_2-(CH_2)_n-CH_2OR_{17}$; n is an integer of from 6 to 7; and $—OR_{17}$ forms hydroxy or an ether protecting group convertible to hydroxy by hydrolysis.

4,894,481

METHOD OF MAKING CYCLIC ARYL CHLOROPHOSPHITES

Edward A. Burt, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed Jul. 5, 1988, Ser. No. 215,283
Int. Cl.[4] C07F 9/02
U.S. Cl. 568—12 17 Claims

1. A process of making a cyclic chlorophosphite, said process comprising reacting phosphorus trichloride with a 2,2'-bridged bisphenol in which the bridging group is a direct bond or a group selected from alkylene, alkylidene, thio, polythio and $—CH_2SCH_2—$ in an inert solvent and in the presence of a catalytic amount of a solid cross-linked polyvinylpyridine resin wherein the cross-linking agent is divinylbenzene or divinylpyridine.

4,894,482

PROCESS FOR DRYING HYDROGEN FLUORIDE-CARBOXYLIC ACID MIXTURES

Daniel D. Lindley, Eppstein, Fed. Rep. of Germany, and Carl D. Murphy, Corpus Christi, Tex., assignors to Hoechst Celanese Corporation, Sommerville, N.J.

Filed Dec. 6, 1988, Ser. No. 281,302
Int. Cl.[4] C09C 45/46
U.S. Cl. 568—319 17 Claims

1. A process of removing water from a mixture of hydrogen fluoride (HF), a carboxylic acid, and water by extractive distillation in the presence of a Lewis base as solvent, which does not azeotrope with water, forms bonds with the HF and carboxylic acid which can be broken by heat and has a boiling point at atmospheric pressure at least about 20° C. above that of the carboxylic acid, and taking off an overhead vapor comprising a major proportion of the water in said mixture.

8. A process comprising subjecting an aromatic compound to a Friedel-Crafts acylation with a carboxylic acid in the presence of hydrogen fluoride as catalyst to obtain a product mixture containing an aromatic ketone, hydrogen fluoride, said carboxylic acid, and water of reaction, subjecting said product mixture to a solvent assisted distillation in the presence of an assisting solvent which has an atmospheric boiling point up to about 200° C. and is stable with respect to HF, to obtain an overhead vapor containing said assisting solvent and most of the HF, carboxylic acid, and water of reaction in the product mixture, and a liquid residue containing most of the aromatic ketone in the product mixture, separating assisting solvent from the overhead of said solvent assisted distillation and recycling it to said solvent assisted distillation, subjecting the remainder of the overhead from the solvent assisted distillation comprising hydrogen fluoride, carboxylic acid and water to an HF recovery distillation to separate excess HF as overhead which does not azeotrope with the water and carboxylic acid present, recycling said excess HF to said Friedel-Crafts acylation, subjecting the residue of said HF recovery distillation comprising a mixture of hydrogen fluoride (HF), carboxylic acid, and water to an extractive distillation in the presence of a Lewis base as solvent, which does not azeotrope with water, forms bonds with the HF and carboxylic acid which can be broken by heat and has a boiling point at atmospheric pressure at least about 20° C. above that of the carboxylic acid, taking off an overhead vapor from said extractive distillation comprising a major proportion of the water in said product mixture, subjecting the residue of said extractive distillation to a solvent regeneration distillation, recycling the overhead of said solvent regeneration comprising HF and carboxylic acid to said Friedel-Crafts acylation, and recycling the residue of said solvent regeneration distillation comprising said Lewis base solvent to said extractive distillation.

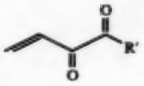
4,894,483

PREPARATION OF VINYLGLYOXAL DERIVATIVES, NOVEL VINYLGLYOXAL DERIVATIVES AND THEIR USE

Peter Neumann, Wiesloch; Hans-Dieter Martin, Duesseldorf; Roland Kramme, Hilden, and Ralf T. Weimann, Duesseldorf, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Oct. 28, 1987, Ser. No. 114,121
Claims priority, application Fed. Rep. of Germany, Nov. 11, 1986, 3638489
Int. Cl.[4] C07C 49/217
U.S. Cl. 568—335 12 Claims

1. A compound of the formula



(I)

where R' is methyl, ethyl, n-propyl, iso-propyl, n-butyl, isobutyl, hexyl, heptyl, octyl, allyl, butenyl, pentenyl, hexenyl, C_3—C_7-cycloalkyl, or phenyl which is unsubstituted or substituted by C_1—C_{12}-alkyl, C_1—C_{12}-alkoxy, halogen, cyano or CF_3.

4,894,484

PYROLYSIS OF PERFLUOROPOLYETHERS

Richard J. Lagow, Georgetown; Thomas R. Bierschenk; Timothy J. Juhlke, both of Roundrock, and Hajimu M. Kawa, Austin, all of Tex., assignors to Exfluor Research Corporation, Austin, Tex.

Continuation-in-part of Ser. No. 796,624, Nov. 8, 1985, abandoned. This application Sep. 3, 1987, Ser. No. 92,465
Int. Cl.[4] C07C 41/01, 43/30, 43/14
U.S. Cl. 568—615 14 Claims

1. A method of cleaving perfluoropolyethers to lower molecular weight fragments, comprising the steps of:

(a) providing a perfluoropolyether selected from the group consisting of perfluoropoly(ethylene oxide), perfluoropolypropylene oxide, perfluoroethylene oxide/-methylene oxide/copolymers, perfluoroethylene oxide/-propylene oxide copolymers, perfluoropoly(tetramethylene oxide) and perfluoropoly(cyclohexyl oxide);

(b) pyrolyzing the perfluoropolyether at a temperature above about 350° C. to cleave the perfluoropolyether into lower molecular weight perfluoropolyethers in the absence of a metal oxide or metal fluoride catalyst; and

(c) condensing and collecting lower molecular weight perfluoropolyethers.

4,894,485

ALKALINE EARTH METAL SALTS OF ETHER CARBOXYLIC ACIDS AS ALKOXYLATION CATALYSTS

Ansgar Behler, Bottrop; Uwe Ploog, Hana, and Elvira Scholz, Duesseldorf, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Jun. 14, 1988, Ser. No. 206,623
Claims priority, application Fed. Rep. of Germany, Jun. 15, 1987, 3719968; Jan. 25, 1988, 3802044
Int. Cl.[4] C07C 41/03
U.S. Cl. 568—618 8 Claims

1. The process of ethoxylating or propoxylating a fatty alcohol consisting essentially of contacting said fatty alcohol with ethylene oxide or propylene oxide in the presence of from about 0.1 to about 2% by weight, based on the weight of the ethoxylated or propoxylated compound, of an alkaline earth metal salt of an ether carboxylic acid corresponding to the following formula

$$[RO-(C_mH_{2m}O)_n-CH_2-COO^-]_xM^{2+} \quad (I)$$

in which

R is a substituent selected from the group consisting of C_1–C_{22} alkyl, C_3–C_{22} alkenyl, phenyl, alkylphenyl containing 1 to 3 C_1–C_{15} alkyl radicals, benzyl and phenylethyl,

M is an alkaline earth metal selected from the group consisting of Ca, Sr and Ba,

m is the number 2 or 3,

n is a number from 1 to 20 and

x is the number 2; or

R is a group corresponding to the following formula

$$-CH_2-COO^-$$

x is the number 1 and

M, m and n are as defined above.

4,894,486

STABILIZER FOR BISPHENOLS AND PROCESS OF USING SAME

Lawrence E. Neil, Jr., Angleton, and Theodore J. Germanos, Lake Jackson, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Dec. 22, 1988, Ser. No. 289,083

Int. Cl.[4] C07C *37/88*

U.S. Cl. 568—702 **11 Claims**

1. In a process for inhibiting the degradation of a bisphenol in which a hydroxycarboxylic acid is employed as the inhibitor, the improvement which comprises employing as the inhibitor a compound selected from the group consisting of lactic, malic and glyceric acids and mixtures thereof.

4,894,487

PREPARATION PROCESS OF 4-(4-HYDROXYPHENYL)-CYCLOHEXANOL

Tohru Miura; Masayuki Furuya, and Teruyuki Nagata, all of Ohmuta, Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Filed Aug. 4, 1988, Ser. No. 228,186

Claims priority, application Japan, Aug. 14, 1987, 62-201939

Int. Cl.[4] C07C *35/23, 35/27*

U.S. Cl. 568—832 **6 Claims**

1. Process for preparation of 4-(4-hydroxyphenyl)cyclohexanol, comprising catalytically reducing 4-(4-hydroxyphenyl)-3-cyclohexen-1-ol in the presence of an amount of hydrogeneffective to achieve said catalytic reduction and din the presence of a catalytically effective amount of at least one effective hydrogenation catalyst, said catalytic reduction being conducted at an effective temperature at which said catalytic reaction occurs, and said catalytic reaction being conducted at an effective pressure at which said catalytic reaction occurs.

4,894,488

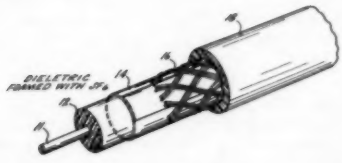
HIGH FREQUENCY SIGNAL CABLE WITH IMPROVED ELECTRICAL DISSIPATION FACTOR AND METHOD OF PRODUCING SAME

Chakra V. Gupta, Conover, N.C., assignor to Comm/Scope, Inc., Catawba, N.C.

Continuation-in-part of Ser. No. 170,774, Mar. 21, 1988, abandoned. This application Feb. 10, 1989, Ser. No. 309,831

Int. Cl.[4] H01B *11/18, 13/14*

U.S. Cl. 174—28 32 Claims



1. A high frequency signal cable having improved electrical attenuation properties, comprising at least one inner signal conductor, an outer shielding conductor surrounding said at least one inner signal conductor, and a foam dielectric disposed between said inner signal conductor and said outer shielding conductor, said foam dielectric comprising a polymer matrix having a multiplicity of cells formed therein, said cells containing residual blowing agent comprising sulfurhexafluoride.

17. A method of producing a high frequency signal cable with improved electrical attenuation properties at high frequencies which comprises extruding a mixture of a molten polymer and a blowing agent comprising sulfurhexafluoride around at least one inner signal conductor, expanding the mixture to form a foam dielectric, and applying an outer shielding conductor around the expanded foam dielectric.

4,894,489

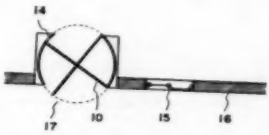
ELECTROMAGNETIC SHIELD-TYPE DOORWAY FOR BUILDINGS AND ELECTROMAGNETIC SHIELDING SYSTEM THEREFOR

Takeshi Takahashi; Masatake Nakamura; Yoshiji Yabana; Toshiyuki Ishikawa, and Koji Nagata, all of Tokyo, Japan, assignors to Shimizu Construction Co., Ltd., Tokyo, Japan

Filed May 20, 1987, Ser. No. 52,635

Int. Cl.[4] H05K *9/00*

U.S. Cl. 174—35 MS 1 Claim



1. An electromagnetic shield-type doorway for a building in which electromagnetic shielding members are used to construct a body of the body and window and doorway openings to provide the overall building with an electromagnetic shielding structure, characterized in that electrically conductive brushes are attached to at least a lower edge and side edge of a revolving door arranged in said doorway, thereby filling gaps at said edges, said electrically conductive brushes being electrically interconnected and grounded at a rotary shaft of said revolving door and electrical wave absorbers are positioned around the periphery of said revolving door.

4,894,490

HIGH TENSION CABLE AND METHOD OF MANUFACTURE THEREOF

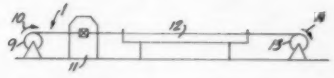
Terutsugu Fujimoto, Suzuka, Japan, assignor to Sumitomo Wiring Systems, Ltd., Japan

Filed Dec. 28, 1987, Ser. No. 138,324

Claims priority, application Japan, Dec. 27, 1987, 62-315273

Int. Cl.[4] H01B *7/22*

U.S. Cl. 174—108 19 Claims



1. A method of making a cable comprising passing a tension member through an extruder to form a settable plastic layer thereon under conditions such that substantially no setting of said plastic layer occurs,

thereafter, winding a wire around said plastic layer to form a plurality of coils at least partially embedded in said plastic layer,

thereafter extruding an insulation layer over said coils, and causing said plastic layer to set.

17. A cable which is the product of the method of claim 1.

4,894,491

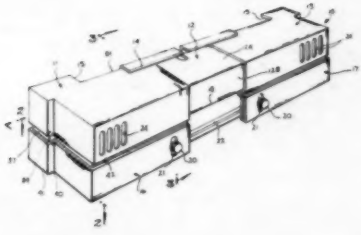
CABLE COVER ASSEMBLY

Gordon Glau, Moreno Valley, Calif., assignor to Kraft Systems, Inc., Vista, Calif.

Filed Jan. 17, 1989, Ser. No. 297,992

Int. Cl.[4] H05K *5/03*

U.S. Cl. 174—135 8 Claims



1. A cover assembly comprising:

a central support member having a first surface disposed substantially perpendicular to a second surface, said second surface having a first elongated slot formed therein;

at least one end member slidably engaged with said central support member, said end member having third, fourth and fifth surfaces disposed substantially perpendicularly to each other, said fourth surface having an opening formed therein registered with said first elongated slot;

said central support member having a lip formed on said first surface receiving an edge of said end member to permit slidable movement of said end member with respect to said central support member, and prevent vertical movement of said central support member with respect to said end member;

at least one bracket member slidably engaged with said end member, said bracket member having a sixth surface disposed substantially perpendicular to a seventh surface, said bracket member having a second elongated slot formed therein registered with said first elongated slot and said opening;

said bracket member having a second lip formed thereon

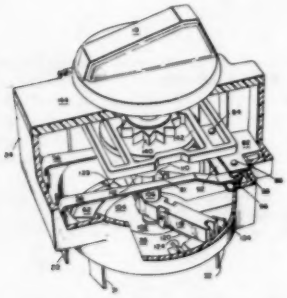
receiving an edge of said fifth surface of said end member for permitting slidable movement of said bracket member with respect to said end member.

4,894,492

MOTOR CONTROL VARIABLE SPEED REVERSING SWITCH

Nicholas R. Palumbo, 28 Redwood Dr., Cumberland, R.I. 02864

Filed Sep. 1, 1988, Ser. No. 239,506
Int. Cl.[4] H01H *9/00*
U.S. Cl. 200—1 V **6 Claims**



1. A rotary switch for interconnecting a motor, a direct current power source, and a resistor network, providing a plurality of selectable forward and reverse motor speeds responsive to displacement of a single control in a single degree of freedom, comprising:

a case, a switch control supported by said case, a shaft rotatable within said case about an axis, responsive to motion of said control, and a plurality of switch outputs supported by said case,

two electrical conductors, each having a switch input portion fixed in said case for connection to said power source, and a movable portion providing a contact,

a source terminal fixed in said case and connected to one of said switch outputs for connection to said motor,

an integral switch bus having a polarity terminal and an axially spaced track terminal,

cooperative reversal means carried on said shaft and said conductors for moving said two conductor movable portion contacts interdependently between said source terminal and said bus polarity terminal, for a first polarity condition and an opposite polarity condition, responsive to said shaft moving between two rotational conditions, and for holding said two conductor contacts in a power OFF condition, responsive to said shaft being in a third rotational condition,

three circular tracks disposed at three radially spaced positions centered about said axis, each of said tracks comprising conductive and non conductive arcuate segments, at least one said track conductive segment being said bus track terminal, defining a powered track, each said conductive segment of each track other than said powered track being connected to a said switch output for connection to said resistor network,

two arcuately spaced electrical bridging elements carried on said shaft, each said bridging element providing three spaced electrically connected track contacts, said contacts of a first said bridging element being disposed for connecting at least two said conductive segments of a first pair of said tracks including a said powered track, said contacts of the other said bridging element being disposed for connecting at least two said conductive segments of a distinct pair of said tracks including a said powered track,

said track conductive segments, said electrical bridging elements, and said track contacts being mutually arcuately, axially and radially spaced such that, at successive spaced rotational positions of said shaft, said bridging elements successively connect distinct sets of said conductive segments, successively to provide at said switch outputs a plurality of distinct switch output conditions including a switch output OFF condition,

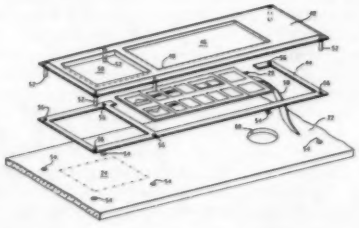
said bridging elements being arcuately spaced with respect to said reversal means such that a first plurality of said switch output conditions is provided in said first polarity condition, a second plurality of said switch output conditions is provided in said opposite polarity condition, and said switch output OFF condition is provided in said power OFF condition.

4,894,493

MEMBRANE TOUCH CONTROL PANEL ASSEMBLY FOR AN APPLIANCE WITH A GLASS CONTROL PANEL

John M. Smith, and Howard R. Bowles, both of Louisville, Ky., assignors to General Electric Company, Louisville, Ky.

Filed Nov. 4, 1988, Ser. No. 267,507
Int. Cl.[4] H01H *13/70*
U.S. Cl. 200—5 A **8 Claims**



5. A membrane touch switch control panel assembly for a cooking appliance having a plurality of surface units and a glass control panel disposed proximate at least one of the surface units, said assembly comprising:

a laminated membrane switch array disposed on the outer surface of the glass control panel;

said switch array including an outer appearance graphics layer formed of a flexible resilient material capable of withstanding temperatures in excess of 220° F.;

mounting means circumscribing said switch array for sealingly securing said switch array at the edges thereof to the glass control panel;

said outer appearance graphics layer and said mounting means together simulating the appearance of a glass capacitive touch panel.

4,894,494

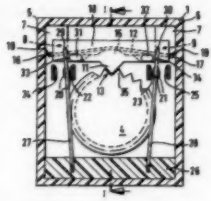
PULSE GENERATOR

Wolfgang Rösl, Eckental, and Jochen Rose, Röthenbach, both of Fed. Rep. of Germany, assignors to Alcatel N.V., Amsterdam, Netherlands

Filed Jul. 13, 1988, Ser. No. 220,429
Claims priority, application Fed. Rep. of Germany, Jul. 28, 1987, 3724898; Nov. 20, 1987, 3739296
Int. Cl.[4] H01H *19/20*
U.S. Cl. 200—11 R **14 Claims**

1. A pulse generator comprising a gear and an actuating member having a projection which engages a tooth space of the gear in the rest position and which is deflectable toward one side or the other depending on the direction of rotation of the gear, with said actuating member being capable of actuating one of two laterally disposed contacts in each of its deflected positions; and wherein: said actuating member is made of insulating material and is movable both sideways and in the direction of the teeth of the gear; a compression spring de-

signed as a pressure and restoring spring is provided which presses said actuating member against the teeth of the gear and which forces the projection into engagement with the tooth space in the rest position; said actuating member is pivotable on



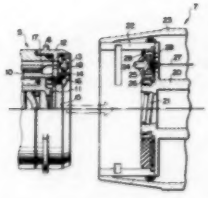
a journal extending into an oblong hole of the actuating member, and movable in the direction of the line connecting the axis of rotation of the gear and the projection; and said journal is provided on a shaft of the gear.

4,894,495

WATERTIGHT ELECTRICAL CONTACT UNITS

Masato Toda, Hachioji, Japan

Continuation of Ser. No. 19,352, Feb. 26, 1987, abandoned. This application Jul. 18, 1988, Ser. No. 222,339
Claims priority, application Japan, Mar. 13, 1986, 61-055854
Int. Cl.[4] H01R *33/96*
U.S. Cl. 200—51.12 **11 Claims**



1. Apparatus comprising:

component mounting means including first and second mounting sections relatively movable between first and second positions;

electrical switch means including first and second cooperating contact members that are carried by the respective first and second mounting sections, said cooperating contact members being engaged when said mounting sections are in said first position and are disengaged when said mounting sections are in said second position;

a watertight electrical contact unit secured to said first mounting section, said contact unit including a watertight elastic member and said first contact member;

said first contact member including:

(a) a contact portion at a first side of said elastic member;

(b) a conductor connecting portion for electrically connecting said first contact member to a conductor when said first and second mounting sections are in said first position and for connecting said first contact member to the conductor when said first and second mounting sections are in said second position, said conductor connecting portion being located at a side of said elastic member which is opposite to said first side of said elastic member; and

(c) another portion excluding said contact portion and said conductor connecting portion;

with said mounting sections in said first position said contact portion being in direct engagement with said second contact member;

said elastic member being interposed between said first mounting section and said first contact member, and being a molded unitary body wherein said another portion of said contact member is embedded;

said contact portion being operatively positioned to engage said second contact when the latter is disposed forward of said contact portion;

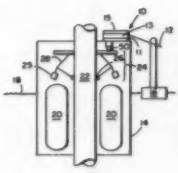
said elastic member including an annular groove open at its rear facing side and formed around said first contact member so as to facilitate movement of said first contact member in the axial direction relative to said first mounting section when said first contact member is being placed in contact with said second contact member.

4,894,496

AUXILIARY WINDING CUT-OUT SWITCH FOR SUMP PUMP MOTOR

Nicholas R. Palumbo, 28 Redwood Dr., Cumberland, R.I. 02864

Filed Jun. 29, 1988, Ser. No. 213,089
Int. Cl.[4] H01H *35/10*
U.S. Cl. 200—80 R **9 Claims**



1. For use in controlling power from a power source to a sump pump motor having main windings and auxiliary windings, and having a rotor providing a control surface axially movable, responsive to rotor speed, between a first motor-off position and a second predetermined-speed position, which is assumed when said motor attains a predetermined speed an auxiliary winding cut-out switch comprising

a housing providing guide means and first and second terminal-retaining structures,

a housing cover providing a spring seat,

a first electrically conductive terminal having a fixed contact, said first terminal being fixed in said first terminal-retaining structure for electrical connection between a power source and said motor auxiliary windings,

a second electrically conductive terminal, fixed in said second terminal-retaining structure for electrical connection between said power source and said motor auxiliary windings, having a contact arm pivotable with respect to said second terminal-retaining structure, and having a cooperating contact carried on said contact arm for cooperation with said fixed contact,

controlled deflection means for positioning said cooperating contact with respect to said fixed contact, comprising

a first element axially slidable within said housing guide means and having

a follower portion for following contact with said control surface,

a first element spring seat remote from said follower portion, and

a stop portion engageable with said guide means for limiting axial travel of said first element away from said housing,

a second element axially slidable within said guide means, having

a second element lower spring seat,

an upper spring seat,

a stop portion for limiting axial travel of said second element away from said housing, and

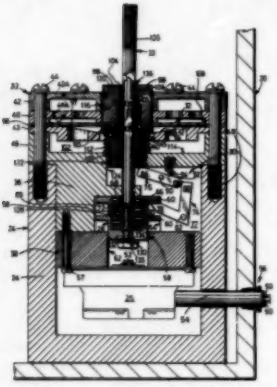
an offset coupler,
a first removable coil compression spring seated between said first element spring seat and said second element lower spring seat, said first spring being electrically unconnected with either said terminal,
a second removable coil compression spring seated between said second element upper spring seat and said cover spring seat, said second spring being electrically unconnected with either said terminal,
said first and second elements, said guide means, said cover spring seat, and said first and second springs all being concentric and colinear.

4,894,497

HIGH TEMPERATURE PRESSURE SWITCH ASSEMBLY FOR USE WITH EXPLOSION-PROOF ENCLOSURES

Jennings Lycan, Huntington, W. Va., assignor to Service Machine Company, Huntington, W. Va.

Filed Feb. 8, 1989, Ser. No. 308,141
Int. Cl.[4] H01H *35/34*
U.S. Cl. 200—83 R **13 Claims**



8. A high temperature pressure switch assembly according to claim 4 in which:
said housing has a cylindrical bore in one wall thereof;
a bushing secured to and movable with the pressure responsive member is reciprocably slidable within said cylindrical bore and is accessible from the exterior of the housing for testing;
whereby the bushing can be displaced to move the pressure responsive member and thereby simulate movement of the pressure responsive member in response to a sudden rise in ambient air pressure.

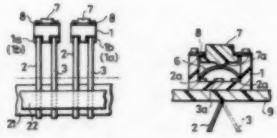
4,894,498

PUSH BUTTON SWITCH HAVING RADIAL LEADS

Kazuyoshi Kagawa, and Takeshi Hakozaki, both of Iwaki, Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan

Filed Apr. 29, 1988, Ser. No. 187,824
Claims priority, application Japan, Jun. 4, 1987, 62-86191[U]
Int. Cl.[4] H01H *13/10*
U.S. Cl. 200—284 **1 Claim**

1. A push button switch for use with radial lead automatic insertion equipment comprising:
a case;
fixed contacts arranged on an inner bottom surface of said case and positioned in a substantially horizontal plane;
a movable contact supported in said case for movement vertically with respect to said horizontal plane;
a push button stem movably supported in said case in an operative relationship with said movable contact for movement vertically with respect to said horizontal plane;
a pair of terminals formed integrally with said fixed contacts and extending away from said fixed contacts in a same direction, said fixed contacts and said terminals being formed of metal sheet material;
a pair of recesses formed in an outer bottom surface of said case, each of said recesses having a vertical wall and a horizontal wall,
said terminals projecting out from said case horizontally



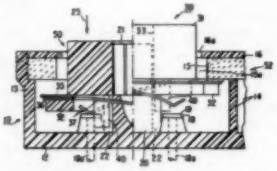
where said recesses are located, said terminals projecting through said vertical wall of said recesses at a point where said horizontal and vertical walls of said recesses meet,
said terminals being identically bent at substantially right angles with respect to said fixed contacts so as to be arranged against an outside surface of said vertical walls of said recesses,
portions of said terminals which are at substantially right angles with respect to said fixed contacts being parallel, coplanar and positioned in a single row so as to form radial leads of said push button switch.

4,894,499

ELECTRIC PUSH-BUTTON SWITCH

Hans Beck, Zürich; Heinz Waser, Schlieren, and Peter Bettschart, Zürich, all of Switzerland, assignors to Contraves AG, Zürich, Switzerland

Filed Sep. 26, 1988, Ser. No. 249,610
Claims priority, application Switzerland, Sep. 30, 1987, 03794/87
Int. Cl.[4] H01H *5/02*
U.S. Cl. 200—404 **6 Claims**



1. An electric push-button switch, comprising:
a housing portion;
fixed counter contact means including a plurality of spaced counter contacts provided for the housing portion;
a push-button portion which is generally linearly moveable in a predetermined direction of movement;
means defining a snap-action mechanism for said push-button portion;
said push-button portion being generally linearly moveable between a rest position and an operating position while overcoming a snap action of said snap-action mechanism;
contact bridge means comprising resilient contact arms provided for coaction with said fixed counter contact means;
said fixed counter contact means being contactingly engaged by said resilient contact arms when said push-button portion assumes said operating position;

said resilient contact arms being inclined with respect to said predetermined direction of movement of the push-button portion;

said housing portion being provided with guide column means;

said push-button portion being provided with guide column means;

said guide column means of said housing portion and said guide column means of said push-button portion mutually contactingly engaging with one another for generally linearly guiding and securing said push-button portion against undesired rotation;

said guide column means of said housing portion and said guide column means of said push-button portion, viewed in the predetermined direction of movement of said push-button portion, being arranged at a region located between said plurality of spaced counter contacts;

said guide column means of said housing portion and said guide column means of said push-button portion being in multiple linear non-planar contact with one another and which multiple linear non-planar contact extends in said predetermined direction of movement of the push-button portion; and

said multiple linear non-planar contact changing in length during the movement of said push-button portion and being greatest when said push-button portion assumes said operating position thereof.

4,894,500

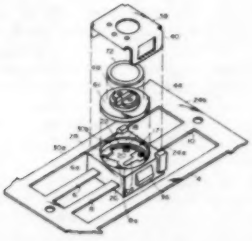
ROTARY SELECTOR SWITCH

Atsuo Yamazaki; Toshiaki Kaba, both of Iruma, and Kenji Sakaguchi, Hanno, all of Japan, assignors to Copal Electronics Co., Ltd., Tokyo, Japan

Filed Dec. 1, 1987, Ser. No. 127,506

Int. Cl.[4] H01H *21/62*

U.S. Cl. 200—565 **2 Claims**



1. In a rotary selector switch having a wiper means on a rotor which is rotatably mounted in a cavity in a housing and having a cover holding the rotor in the cavity, the rotor being rotatable in the cavity for causing the wiper means to contact fixed contact elements on said housing to connect electrically at least one of the fixed contact elements with one of the remaining fixed contact elements, the improvement comprising, in combination:

a rotor stopper means comprising a pair of ridges extending inwardly from said housing into said cavity, each ridge having opposite circumferentially spaced side walls, and a further ridge projecting from said rotor into said cavity and which has a pair of dovetail portions on radially opposite ends thereof each of which has circumferentially spaced vertical walls, the side walls of said ridges being abutted by corresponding vertical walls of the dovetail portions of said further ridge upon the rotation of the rotor in clockwise or counterclockwise direction for stopping the rotation of the rotor, and

a click mechanism for providing an audible sound to an operator comprising projections projecting from said housing into said cavity at equally spaced circumferential positions, one of the contact elements being disposed on the bottom of said cavity and having a hole therethrough and one of the projections protruding through said hole, one of the dovetail portions of said further ridge having a slot in the radially outer end thereof engageable with the projections during rotation of the rotor for producing an audible click.

4,894,501

METHOD AND APPARATUS FOR INDUCTION HEATING OF GEAR TEETH

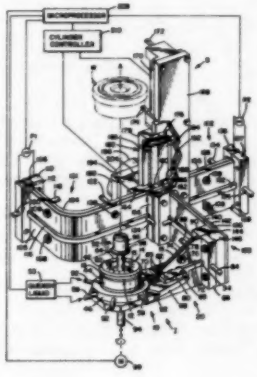
George D. Pfaffmann, Farmington; Norbert R. Balzer, Troy; George M. Mucha, Parma Hts., and Donald E. Novorsky, Pleasant Ridge, all of Mich., assignors to Tocco, Inc., Boaz, Ala.

Continuation-in-part of Ser. No. 185,588, Apr. 21, 1988, which is a continuation of Ser. No. 1,624, Jan. 8, 1987, Pat. No. 4,757,170, which is a continuation-in-part of Ser. No. 878,186, Jun. 25, 1986, Pat. No. 4,675,488. This application Mar. 2, 1989, Ser. No. 318,347

The portion of the term of this patent subsequent to Jul. 12, 2005, has been disclaimed.

Int. Cl.[4] H05B *6/14*

U.S. Cl. 219—10.43 **47 Claims**



1. A method of hardening the undulating generally circular teeth surface of an axially elongated gear having a central axis, said teeth surface including teeth and connecting roots, said method comprising the steps of:

(a) providing an inductor coil coaxially aligned with said gear and having a circular inductor surface closely spaced from said teeth surface;

(b) causing first relative axial movement between said inductor surface and said teeth surface to define a first axially moving band area at said teeth surface corresponding to said inductor surface;

(c) progressively preheating said teeth surface along said first axially moving band area sufficiently to heat said roots to a temperature below a quench hardening temperature;

(d) causing second relative axial movement between said inductor surface and said teeth surface to define a second axially moving band area at said teeth surface corresponding to said inductor surface;

(e) progressively finally heating said preheated surface along said second axially moving band sufficiently to heat said preheated surface to a quench hardening temperature; and,

(f) quenching said finally heated surface immediately following said final heating thereof.

4,894,502

AUTOMATIC COOKING CONTROL SYSTEM FOR A MICROWAVE OVEN

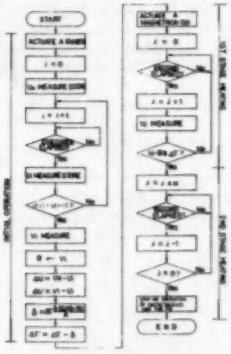
Ki T. Oh, Kyungsangnam, Rep. of Korea, assignor to Goldstar Co., Ltd., Seoul, Rep. of Korea

Filed Oct. 13, 1988, Ser. No. 256,964

Claims priority, application Rep. of Korea, Oct. 13, 1987, 11354/1987

Int. Cl.[4] H05B 6/68

U.S. Cl. 219—10.55 M 12 Claims



1. A method of optimally cooking food in a microwave oven having a heating chamber, a fan and a magnetron and using an automatic cooking control system, comprising the steps of:

(a) actuating the fan to cause an air temperature in an interior of the heating chamber to become uniform;

(b) setting a first variable to zero;

(c) measuring and storing a first incremental value for a first temperature of air flowing into the heating chamber, the first incremental value being related to a present value of the first variable;

(d) incrementing the first variable by one;

(e) delaying for a period of ten seconds;

(f) measuring and storing the first incremental value for the first temperature of the air flowing into the heating chamber;

(g) determining if a present first incremental value is equal to the first incremental value measured ten seconds previously;

(h) measuring a second incremental value for a second temperature of air flowing out of the heating chamber, when the present first incremental value is equal to the first incremental value measured ten seconds previously, the second incremental value being related to the present value of the first variable;

(i) storing the second incremental value as a first reference value;

(j) calculated a first temperature difference, the first temperature difference being equal to a difference between the first incremental value when the first variable is equal to zero and the present first incremental value;

(k) calculating a second temperature difference, the second temperature difference being equal to a difference between the present incremental value and the present first incremental value;

(l) calculating a temperature compensation value;

(m) calculating a compensated temperature by adding a predetermined temperature difference to the temperature compensation variable;

(n) actuating the magnetron for a first period of time; and

(o) actuating the magnetron for a second period of time, thereby automatically cooking food in the microwave oven.

4,894,503

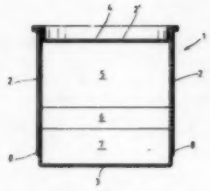
PACKAGES MATERIALS FOR SHIELDED FOOD CONTAINERS USED IN MICROWAVE OVENS

Dan J. Wendt, Lino Lakes, Minn., assignor to The Pillsbury Company, Minneapolis, Minn.

Filed Oct. 23, 1987, Ser. No. 113,171

Int. Cl.[4] H05B 6/80

U.S. Cl. 219—10.55 E 39 Claims



1. A package for heating of food material representing a low load in a microwave environment employing a conductive sheet in close proximity to a dielectric material that is selected to minimize failure of the dielectric material during microwave heating, comprising:

a conductive sheet, the conductive sheet being exposed to microwave radiation when the package is placed in a microwave oven and the oven is energized, the conductive sheet having an edge, the conductive sheet causing a gain in electrical field strength greater than 3 near at least a portion of an edge;

a rigid, dimensionally stable dielectric support for the conductive sheet, the dielectric support being mechanically associated with the conductive sheet to maintain dimensional stability of the combination of the dielectric support and the conductive sheet, the dielectric support extending beyond at least a portion of an edge of the conductive sheet, the dielectric support being spaced less than 0.5 inch from the conductive sheet, the dielectric support being composed of material selected to avoid failure of the dielectric support in high electrical fields which may exist near the conductive sheet during microwave irradiation, the dielectric support material having a dielectric loss factor less than 0.005, the dielectric support material having a failure temperature greater than 101° C.;

the package being an intrinsically nonarcing package;

food supported by the package, the food representing a low load in a microwave oven cavity, where microwave cooking is continued for a predetermined period of time desired according to the food selected for the package when the package is placed in a microwave oven cavity.

4,894,504

METHOD APPARATUS FOR GENERATING MULTIPLE SPARKS FOR AN ELECTRICAL DISCHARGE WIRE CUTTING MACHINE

Thomas J. Truty, Streamwood, Ill., assignor to T-Star Industrial Electronics Corporation, Wheeling, Ill.

Filed Jun. 30, 1988, Ser. No. 214,113

Int. Cl.[4] B23H 7/04

U.S. Cl. 219—69.12 21 Claims

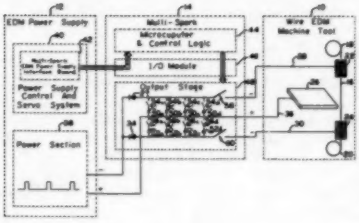
1. An apparatus for controlling the flow of electrical energy between an electrically conductive piece part and a wire electrode of an electrical discharge wire cutting machine, comprising:

a pulse type power supply having first and second leads of opposite polarity, said first lead being electrically connected to said piece part and said second lead having first and second portions connected to said wire electrode at two separate spaced apart locations;

first and second storage means connected between said first

lead line and said first and second portions of said second lead line; and,

means for electrically isolating said first and second portions of said second lead line whereby said first and second



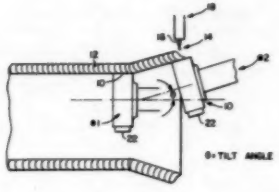
portions of said second lead line are electrically independent from one another and whereby electrical energy may flow independently through said first and second portions of said second lead line.

4,894,505

MODIFIED ROTATING REUSABLE PREFORM

Gregory D. Malone, Powell; Michael D. McAninch, and Patrick M. Ryan, both of Alliance, all of Ohio, assignors to The Babcock & Wilcox Company, New Orleans, La.

Filed Dec. 22, 1988, Ser. No. 288,587
Int. Cl.[4] B23K *9/04*
U.S. Cl. 219—76.11 **15 Claims**



1. An apparatus for building a workpiece by deposit welding, comprising:

a welding head for depositing molten weld material;

a rotatable, reusable preform for forming, supporting, and cooling the molten weld material deposited directly on the surface thereof;

means for varying the shape of rotatable, reusable preform; and

means for moving the workpiece which continuously provides a new region of said rotatable, reusable preform surface underneath said welding head.

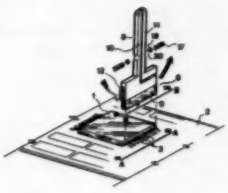
4,894,506

METHOD AND APPARATUS FOR REFLOW SOLDERING OF ELECTRICAL COMPONENT LEADS, INCLUDING FLOATING HEATER BAR

Klaus D. Woerner, Cambridge, Canada, assignor to Automation Tooling Systems Inc., Kitchener, Canada

Filed Sep. 20, 1988, Ser. No. 246,796
Int. Cl.[4] B23K *1/12*
U.S. Cl. 219—85.22 **18 Claims**

1. A method of reflow soldering a row of electrical component leads to a printed circuit board using a heater bar, comprising the steps of, firstly, moving the heater bar to a position above the location of said leads and allowing said heater bar to rock within its plane to float into proper position, and secondly, then clamping said heater bar, supplying voltage to heat said heater bar, and applying soldering pressure.

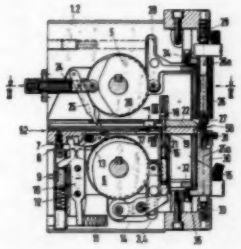


4,894,507

WELDING DEVICE

Horst Thode, Holbeinstrasse 41, D-7880 Bad Säckingen, Fed. Rep. of Germany

Filed May 4, 1988, Ser. No. 190,006
Int. Cl.[4] B23K *11/32*
U.S. Cl. 219—86.7 **11 Claims**



1. A device for welding a contact piece onto support material, said device comprising:

two electrodes for welding the contact piece onto the support material, said electrodes being arranged along a longitudinal axis;

first feed means for feeding the support material between said electrodes with the surface of the support material to which the contact is to be welded being fed perpendicular to said longitudinal axis;

second feed means for separately feeding the contact piece between said electrodes and adjacent to the support material;

an electrode insert associated with one of said electrodes for engaging the contact piece when the contact piece is adjacent to the support material;

electrode rotating means for rotating said one of said two electrodes to thereby rotate the contact piece with respect to the support material; and

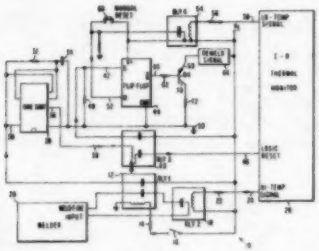
synchronization means for synchronizing said first feed means, said second feed means, and said electrode rotating means.

4,894,508

WELDER CONTROL SYSTEM

Gregory S. Glenn, Los Angeles, and William O. Montjar, Palmdale, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Nov. 4, 1988, Ser. No. 267,422
Int. Cl.[4] B23K *11/24*
U.S. Cl. 219—110 **11 Claims**



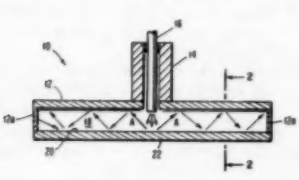
1. A welding arrangement comprising:
a welding apparatus for welding in response to a weld fire signal;
an infrared monitor for sensing weld temperature generated by said welding apparatus and generating output signals at a predetermined low temperature and a predetermined high temperature;
pulse generating means for generating a pulse of a predetermined width;
switch means for simultaneously triggering said pulse generating means to generate said pulse of a predetermined width and generating a weld fire signal to weld;
flip-flop circuit means being set by said pulse generated by said pulse generating means and being reset by a low temperature signal from said infrared monitor;
reweld signal generating means responsive to the output of said flip-flop circuit means for generating a reweld signal upon a low temperature signal from said infrared monitor; and
means for terminating said weld fire signal upon a high temperature signal from said infrared monitor.

4,894,509

LASER ASSISTED HEATER BAR FOR MULTIPLE LEAD ATTACHMENT

Pedro A. Chalco, Yorktown Heights, and Joseph C. Andreshak, Mahopac, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 13, 1988, Ser. No. 283,668
Int. Cl.[4] B23K *26/00*
U.S. Cl. 219—121.6 **19 Claims**



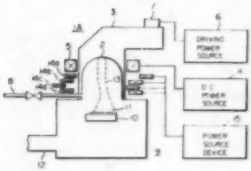
1. Heater apparatus comprising:
a thermally conductive body portion having an internal hollow cavity enclosed within, the cavity having surfaces substantially reflective to incident optical radiation and partially absorptive of the incident optical radiation such that said body portion is heated by the absorbed optical radiation; and
means coupled to the cavity for delivering the optical radiation thereto, said delivering means being comprised of an optical fiber having an output end in optical communication with the cavity and an input end for coupling to a source of optical radiation.

4,894,510

APPARATUS FOR UNIFORMLY DISTRIBUTING PLASMA OVER A SUBSTRATE

Koichiro Nakanishi; Hiroki Ooters; Minoru Hanazaki, and Toshihiko Minami, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Sep. 3, 1987, Ser. No. 92,590
Claims priority, application Japan, Sep. 5, 1986, 61-209836; Sep. 10, 1986, 61-214828; Mar. 2, 1987, 62-47307
Int. Cl.[4] B23K *9/00*
U.S. Cl. 219—121.43 **22 Claims**



1. A plasma processor comprising:
a plasma generation portion which generates a plasma through electron cyclotron resonance; and
a plasma reaction portion in which a substrate to be processed with the plasma generated by said plasma generation portion is located;
said plasma generation portion having a center axis running through the substrate and including:
a plasma generating glass tube which can supply a plasma generating gas,
a radio frequency (r.f.) waveguide which accommodates said plasma generating glass tube therein and which establishes a nonuniform r.f. electric field perpendicular to an axial direction of said plasma generation portion,
coil means arranged around said r.f. waveguide for establishing a nonuniform magnetostatic field in the axial direction, the r.f. electric field and the magnetostatic field causing plasma to flow as a plasma current in the axial direction, the plasma current having a plasma current axis, and
power source means connected to provide current to at least a part of said coil means for subjecting a motion to a magnetic field induced by at least said part of said coil means, the motion of the magnetic field causing a motion of the plasma current including a deviation of the axis of the plasma current from the center axis of the plasma generation portion, thereby distributing plasma over the substrate with improved uniformity.

4,894,511

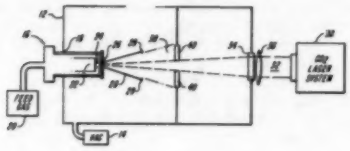
SOURCE OF HIGH FLUX ENERGETIC ATOMS

George E. Caledonia, Milton; Robert H. Krech, Saugus; Byron D. Green, Reading, and Anthony N. Pirri, Andover, all of Mass., assignors to Physical Sciences, Inc., Andover, Mass.

Filed Aug. 26, 1986, Ser. No. 900,616
Int. Cl.[4] B23K *9/00*
U.S. Cl. 219—121.52 **36 Claims**

1. Apparatus for generating a nearly mono-energetic, high flux beam of high velocity atomic gas particles comprising:
a vacuum chamber;

nozzle means within the vacuum chamber for ejecting a confined flow of a gas into a narrow aperture;

means for causing breakdown of the gas flow into a plasma within the narrow aperture;

means for accommodating volumetric expansion of the plasma to produce a high velocity nearly mono-energetic atomic beam.

4,894,512

METHOD AND DEVICE FOR UNDERWATER ELECTRICAL WELDING

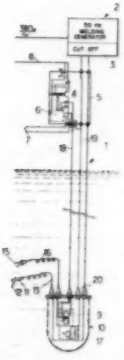
Rey Heusi, Colmar; Bernard Durand, Marseille, and Philippe Blanchard, Draveil, all of France, assignors to Electricite De France (Service National), Paris and Compagnie Maritime D'Expertises, Marseille-Cedex, both of, France

Filed Jun. 30, 1988, Ser. No. 213,389

Claims priority, application France, Jul. 1, 1987, 87 09438

Int. Cl.[4] B23K *9/06*

U.S. Cl. 219—130.4 **8 Claims**



1. Method of underwater arc welding comprising the steps of:

placing a welding electrode nearby a parent material to be welded, immerged in water,

generating a high frequency voltage between said electrode and said parent material for starting a striking arc between said electrode and said parent material through said water, and thus supplying a high frequency current to said electrode, after said striking arc has been initiated.

generating a welding voltage between said electrode and said parent material supplying a nominal welding current to said electrode, for producing a weld at said parent material, and

sustaining the high frequency current superimposed to the welding current and much smaller than the welding current, for stabilizing said welding arc across a film of said water during the whole time duration of the underwater arc welding.

4,894,513

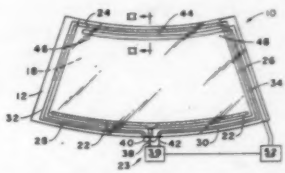
HEATABLE WINDSHIELD TEMPERATURE CONTROL

Harry S. Koontz, Pena Hills Township, Allegheny County, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jul. 5, 1988, Ser. No. 215,147

Int. Cl.[4] H05B *1/02*

U.S. Cl. 219—203 **15 Claims**



1. In an electrically heatable transparent article including a dielectric substrate, an electroconductive coating on a surface of said substrate, and first and second spaced apart bus bars along opposing edge portions of said coating to pass a current from one of said bus bars through said coating to the other said bus bars, wherein current flow from said one of said bus bars through said coating to said other of said bus bars results in a selected portion of said coating having a higher temperature than the remaining portions of said coating, the improvement comprising:

an electrically conductive member for sensing temperature changes wherein resistance of said member varies as the temperature of said selected portion of said coating varies;

said member positioned within said transparent article and electrically insulated from said coating and in close proximity to said selected portion of said coating to sense temperature variations in said selected portions wherein resistance output of said member indicates the temperature of said selected portions of said coating.

4,894,514

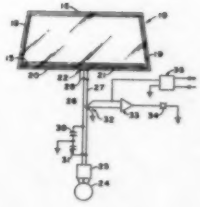
HEATED TRANSPARENCY WITH MALFUNCTION DETECTION MEANS

Wayne A. Delvin, New Kensington, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jul. 5, 1988, Ser. No. 215,473

Int. Cl.[4] H05B *1/02*

U.S. Cl. 219—203 **4 Claims**



1. An electrically heated transparency system comprising a transparent sheet, a heating circuit associated with the transparent sheet including an electrically conductive coating on a surface of the sheet and bus bars in contact with the coating and extending to a terminal area at a marginal edge portion of the sheet, electrically conductive leads extending from the terminal area to a rectifier section of a power supply means, Hall effect current sensor means electromagnetically coupled to at least one of the leads between the rectifier and the terminal area, the output from the Hall effect sensor connected to operational amplifier means for generating a warning signal in response to a predetermined change in the output from the

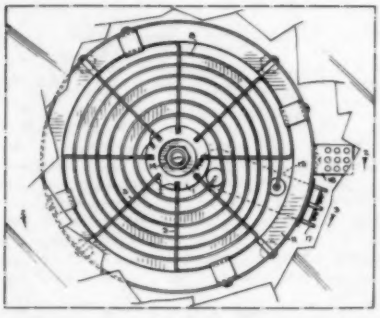
Hall effect sensor, whereby a change in the resistance of the heating circuit on the transparency is indicated.

4,894,515

HOT PLATE FOR COOKING

Bohdan Hurko, Louisville, Ky., assignor to The Kanthal Corporation, Bethel, Conn.

Filed Apr. 8, 1985, Ser. No. 720,733
Int. Cl.[4] H05B *3/68*; F24H *9/02*
U.S. Cl. 219—345 11 Claims



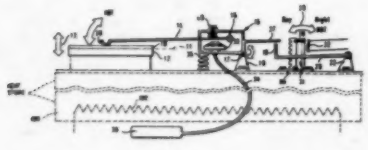
1. A hot plate comprising a hub from which spokes radially extend in a horizontal plane, the spokes being formed by refractory fibrous or woven flat strips each positioned in a vertical plane and having upper edges in which downwardly extending notches are formed, and molybdenum disilicide wire in the form of a flat, spiral having convolutions with portions inserted in the notches, the wire having terminating ends, and means for connecting the ends with electric current.

4,894,516

ELECTRICAL STORAGE HEATERS

Gordon Ellis, Bramshall, and Richard J. Lane, Stone, both of United Kingdom, assignors to Creda Limited, Staffordshire, United Kingdom

Filed Aug. 11, 1988, Ser. No. 231,033
Claims priority, application United Kingdom, Aug. 11, 1987, 8718965
Int. Cl.[4] H05B *1/00*
U.S. Cl. 219—378 12 Claims



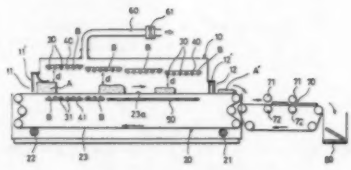
1. An electrical storage heater comprising a heat store, electrical heating means for heating the heat store, a circuit including charge control means for regulating the flow of current to the electrical heating means during an off-peak charging period, means providing for flow of air or other heat distributing fluid into contact with the heat store and thereafter to a space or place to be heated, and flow control means for controlling the flow of heat distributing fluid, wherein the flow control means has associated therewith a setting means which is operative during an on-peak period to variably set the heat flow from the heater, and resetting means operative automatically to cancel the setting of the setting means during the next subsequent off-peak period.

4,894,517

SHRINKING APPARATUS

Masanori Oguri, Nara, Japan, assignor to Sekisui Kaseihin Kogyo Kabushiki Kaisha, Nara; Hoton Ceramics Kabushiki Kaisha, Kanazawa and Nichido Sangyo Kabushiki Kaisha, Tokyo, all of, Japan

Filed Jul. 19, 1988, Ser. No. 221,142
Claims priority, application Japan, Jul. 20, 1987, 62-180628
Int. Cl.[4] F27B *9/06*; F27D *11/00*
U.S. Cl. 219—388 10 Claims



1. A shrinking apparatus for heating and shrinking articles such as molded articles of thermoplastic expanded resin to reduce said articles in bulk,

said shrinking apparatus comprising a furnace having an inlet and an outlet; conveying means extending through said furnace and including a belt conveyor; a plurality of far-infrared heaters in said furnace disposed at distances opposite said conveying means, the distances between said conveying means and the far-infrared heaters opposite thereto being gradually reduced in a direction from the furnace inlet to the furnace outlet; scraper means for scraping off shrunk articles from the belt conveyor, said scraper means coming into contact with an end portion of the belt conveyor; and air blowing means provided outside of said furnace in the vicinity of said outlet for blowing compressed air against the shrunk articles to cool and solidify the articles.

4,894,518

TOASTER OVEN WITH INITIAL TEMPERATURE COMPENSATION AND SENSOR CHECK

Kazuhiko Ishikawa, Kashiwara, and Yoichi Takahashi, Osaka, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 135,549, Dec. 18, 1987, abandoned, which is a continuation of Ser. No. 65,660, Jun. 22, 1987, abandoned, which is a continuation of Ser. No. 796,886, Nov. 12, 1985, abandoned. This application Jan. 6, 1989, Ser. No. 294,994
Claims priority, application Japan, Dec. 6, 1984, 59-259746; Jan. 12, 1985, 60-2665
Int. Cl.[4] H05B *1/02*
U.S. Cl. 219—413 10 Claims

1. A toaster oven comprising

a heating chamber for heating pieces of bread therein,

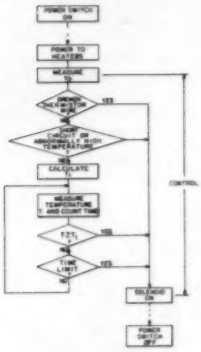
heating means for heating said heating chamber,

temperature detecting means for measuring the temperature inside said heating chamber,

target temperature setting means for calculating a target temperature by a linear equation $aT_0+(b? c)$ where T0 is an initial temperature inside said heating chamber measured by said temperature detecting means at the start of a heating process by said heating means, a and b are experimentally predetermined constants and c is a parameter selectably adjusted according to desired darkness of bread,

judging means for determining whether the temperature

inside said heating chamber measured by said temperature detecting means has reached said target temperature, and heater control means programmed to stop the power supply to said heating means automatically either when said judging means determines that the temperature detected



by said temperature detecting means has reached said target temperature or when the time elapsed form the start of said heating process has reached a preset maximum time interval independently of whether or not the temperature inside said heating chamber detected by said temperature detecting means has reached said target temperature.

4,894,519

ELECTRIC COOKER UNIT AND ELECTRIC COOKING APPARATUS PROVIDED WITH IT

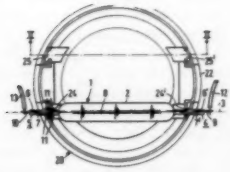
Victor R. Noteiteirs, Turnhout, Belgium, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 168,195, Mar. 15, 1988, abandoned. This application Apr. 25, 1989, Ser. No. 344,541

Claims priority, application Netherlands, Mar. 30, 1987, 8700734

Int. Cl.[4] H05B *3/74*

U.S. Cl. 219—464 **14 Claims**



1. An electric cooking apparatus, comprising:

an electric lamp for producing infrared radiation, said lamp comprising a tubular glass lamp envelope, a glass pinch seal at each end of said envelope for sealing said envelope in a gas-tight manner, said pinch seal having a pair of opposing major faces and a pair of opposing minor faces, a filament within said lamp envelope extending between said pinch seals, and a pair of current-supply conductors each connected to said filament, passing through a respective pinch seal, and extending away from said lamp envelope;

a housing for holding said lamp, said housing comprising a base, and a wall portion having an aperture shaped and positioned for receiving a said pinch seal; and

securing means securing said lamp in said housing, said securing means comprising a face of a said glass pinch seal having a profile, said aperture having an edge portion engaging said profile and preventing translation of said lamp in a direction transverse to said wall portion.

4,894,520

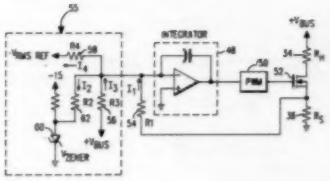
CIRCUIT FOR CONTROLLING POWER DISSIPATED BY AN ELECTRICAL RESISTANCE

Steven A. Moran, Mt. Lebanon, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 13, 1988, Ser. No. 205,694

Int. Cl.[4] H05B *1/02*

U.S. Cl. 219—497 **21 Claims**



1. A circuit for controlling power dissipated by an electrical resistance coupled to a supply voltage, comprising:

first means, electrically coupled to the electrical resistance, for providing a feedback current in dependence upon the current flowing through the electrical resistance without using a squaring circuit;

second means for providing a correction current corresponding to variations in the supply voltage; and

third means for receiving the correction current and the feedback current, for amplifying an error indicated by the correction current and the feedback current, and for controlling the current flowing through the electrical resistance to control the power dissipated by the electrical resistance.

4,894,521

ELECTRIC HEATING ELEMENT FOR FUSING THERMOPLASTIC MATERIALS

Harold J. Evans, Perkins, Okla., assignor to Central Plastics Company, Shawnee, Okla.

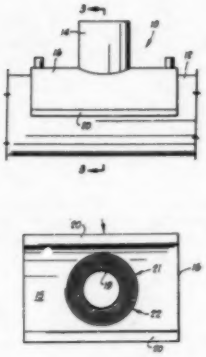
Filed Nov. 21, 1988, Ser. No. 273,930

Int. Cl.[4] H05B *3/58*

U.S. Cl. 219—535 **15 Claims**

1. An electric heating element for electrically fusing thermoplastic materials positioned adjacent thereto comprising an

elongated thermoplastic insulated wire having a portion thereof wound in a substantially planar spiral configuration



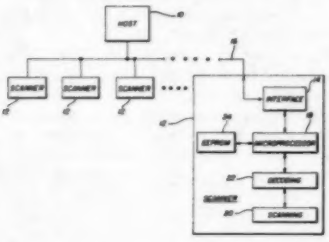
and having adjacent surfaces of said thermoplastic insulation of said wire in said spirally configured portion adhered together.

4,894,522

INTERFACE APPARATUS

Randy D. Elliott, Eugene, Oreg., assignor to Spectra-Physics, Inc., San Jose, Calif.

Filed Nov. 19, 1987, Ser. No. 123,356
Int. Cl.[4] G06K *7/10*
U.S. Cl. 235—472 **10 Claims**



1. Interface apparatus for interfacing between a personal computer and an optical scanner of the type which scans bar code labels and provides data related thereto to a host computer, the interface apparatus permitting the personal computer to act as the host computer for the scanner, said scanner including a microprocessor for controlling operation of said scanner, and an interface circuit, which connects said microprocessor to a host computer and transfers data from said microprocessor to said host computer, comprising:

a printed circuit board,

output means, mounted on said printed circuit board, for transmitting data from the personal computer to the scanner interface circuit under control of an output strobe signal,

input means, mounted on said printed circuit board, for transmitting data from the scanner interface circuit to the personal computer under control of an input strobe signal, and

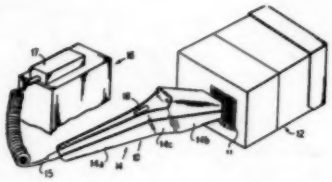
address means, mounted on said printed circuit board, for providing said output and input strobe signals to said output means and said input means, respectively.

4,894,523

INSTANT PORTABLE BAR CODE READER

George E. Chadima, Jr., Cedar Rapids, Iowa, and Vadim Laser, Cincinnati, Ohio, assignors to Norand Corporation, Cedar Rapids, Iowa

Continuation of Ser. No. 234,880, Aug. 19, 1988, said Ser. No. 234,880, is a division of Ser. No. 827,286, Feb. 7, 1986, Pat. No. 4,766,300, said Ser. No. 827,286, is a continuation of Ser. No. 637,693, Aug. 6, 1984, Pat. No. 4,570,057, said Ser. No. 637,693, is a continuation of Ser. No. 334,811, Dec. 28, 1981, abandoned. This application Apr. 18, 1989, Ser. No. 339,953
Int. Cl.[4] G06K *7/10*
U.S. Cl. 235—472 **20 Claims**



1. A portable instant reader comprising:

a hand-held reader unit, said hand-held reader unit having a portion thereof defining at least in part an illumination window, a flashable illuminator disposed near said illumination window and means for producing a flash of light therethrough;

said hand-held reader unit having a portion thereof defining at least, in part, a light receiving window for receiving reflections of light emitted through said illumination window;

a photodetector positioned within said hand-held reader in the path of light rays reflected into and through said light receiving window;

a light gathering means positioned between said light receiving window and said photodetector for receiving a light pattern from said light receiving window and focusing the same onto said photodetector;

said light gathering means comprising a lens system with a sensing field in front of said window having a width of at least about fifty millimeters, said photodetector having an image plane for receiving an image of a pattern in said sensing field, and said light gathering means comprising a lens system providing a resolution at the image plane of at least forty line pairs per millimeter with a depth of focus of at least ten millimeters in front of said window.

4,894,524

LASER RECORDING APPARATUS WITH LASER INTENSITY CONTROL

Masakazu Murase, and Takashi Shoji, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 19, 1988, Ser. No. 259,632
Claims priority, application Japan, Oct. 20, 1987, 62-265008
Int. Cl.[4] G05D *25/02*; H01J *40/14*
U.S. Cl. 250—205 **1 Claim**

1. A laser recording apparatus for recording a continuous tone image on a photosensitive material by striking the photosensitive material with an intensity-modulated light beam, which light beam is put out by a semiconductor laser, which laser is controlled by a drive current based on an emission light level instruction signal corresponding to an image signal and

by scanning said photosensitive material with said light beam, comprising:

a photosensor for detecting the intensity of said light beam;

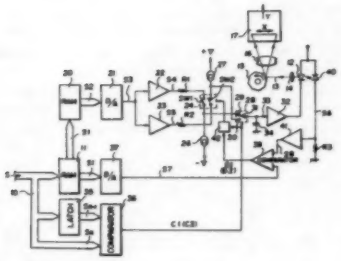
a converter for converting said emission light level instruction signal into a drive current change rate instruction signal for causing the semiconductor laser light output to be a linear function of said image signal and to be changed at a rate proportionate with changes in said emission light level instruction signal;

a non-inverting amplifier for amplifying said drive current change rate instruction signal without sign inversion;

an inverting amplifier for amplifying said drive current change rate instruction signal with sign inversion;

a driver for supplying a drive current, which drive current controls said semiconductor laser;

a first comparator for comparing an image signal for each image element and an image signal for an image element immediately succeeding said each image element in a light beam scanning direction and providing a signal C1 if the



former signal is greater than the latter while providing a signal C2 in the converse case;

a second comparator for comparing the semiconductor laser emission light level indicated by said emission light level instruction signal and the actual emission light level indicated by the output of said photosensor and providing a signal D1 if the latter level is greater than the former level while providing a signal D2 in the converse case;

positive and negative current sources;

a capacitor having one terminal connected to an input line of said driver; and

a switching circuit for receiving the outputs of said first and second comparators and connecting, to said input line of said driver one of the following: said negative current source when said signals C1 and D1 are being received, said non-inverting amplifier when said signals C1 and D2 are being received, said inverting amplifier when said signals C2 and D1 are being received and said positive current source when said signals C2 and D2 are being received.

4,894,525

OPTICAL POWER CONTROL DEVICE FOR SEMICONDUCTOR LIGHT EMITTING ELEMENT

Yoshiyuki Kakuta, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Mar. 21, 1989, Ser. No. 326,771

Claims priority, application Japan, Sep. 16, 1988, 63-231893

Int. Cl.[4] G01J *1/32*

U.S. Cl. 250—205 **6 Claims**

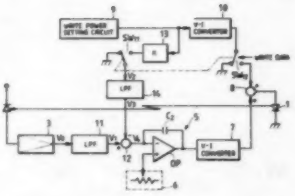
1. An optical power control device for a semiconductor light emitting element, said element including light detecting means for receiving part of a light beam emitted by said element to control the optical power of said element according to a detection output of said light detecting means' said device comprising:

means for supplying to said element a read current corresponding to a read power set value;

first averaging means for averaging said detection output to produce a first averaged signal;

first modulating means for modulating a signal corresponding to a write power set value with write data to produce a first modulated signal;

second averaging means for averaging said first modulated signal to produce a second averaged signal;



subtractor means for subtracting said second averaged signal from said first averaged signal to produce a subtraction output:

means for controlling said read current according to the difference of said subtraction output and said read power set value;

second modulating means for modulating a write current corresponding to said write power set value with said write data to produce a second modulated signal; and

means for superposing said second modulated signal on said read current.

4,894,526

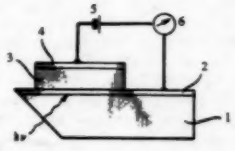
INFRARED-RADIATION DETECTOR DEVICE

Clyde G. Bethea, Plainfield; Kwong-Kit Choi, North Plainfield; Barry F. Levine, Livingston; Roger J. Malik, Summit, and John F. Walker, Westfield, all of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Continuation-in-part of Ser. No. 4,191, Jan. 15, 1987. This application Sep. 15, 1987, Ser. No. 97,567

Int. Cl.[4] H01J *40/14*

U.S. Cl. 250—211 R **22 Claims**



1. A device comprising an infrared-radiation detector, said detector comprising

a substrate-supported heterostructure superlattice compris-

ing semiconductor layers forming a plurality of quantum wells doped for one and the same conductivity type, at least one of said quantum wells having at least two confined states and having an adjoining first barrier which permits tunneling of photo-excited carriers out of said quantum well, subsequent transport of said carriers being at energies above the barrier-top energy of a second barrier, and

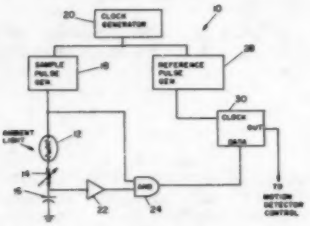
contact means for electrically biasing said superlattice and for sensing an electrical signal in response to radiation incident on said superlattice.

4,894,527

LIGHT DEPENDENT RESISTOR DIGITAL CONTROL CIRCUIT

Edgar M. Smith, Millersville, Pa., assignor to Burle Technologies, Inc., Lancaster, Pa.

Filed Mar. 17, 1989, Ser. No. 324,677
Int. Cl.[4] H01J *40/14*
U.S. Cl. 250—214 AL **3 Claims**



1. A digital ambient light level detector circuit which changes its output signal as an ambient light level passes through a preselected value comprising:

a light dependent resistor with a first terminal and a second terminal;

a capacitor with a higher voltage terminal interconnected with the first terminal of the light dependent resistor, the capacitor also interconnected with a circuit return;

a sample pulse generator generating a pulse voltage, its output interconnected with and applying the pulse voltage to the series circuit of the light dependent resistor and the capacitor, the pulse voltage being of such amplitude and duration to significantly charge the capacitor;

a logic buffer circuit connected to the higher voltage terminal of the capacitor and having an input and an output, the logic buffer circuit generating a signal on its output when a specific threshold voltage is applied to its input;

a reference pulse generator synchronized with the sample pulse generator and generating a pulse voltage on its output which begins after the pulse voltage generated by the sample pulse generator; and

a logic circuit with a clock input, a data input and an output, one signal being generated on the output only when its clock input signal precedes its data input signal, and another signal being generated on the output at all other conditions, the data input being interconnected with the output of the logic buffer circuit and the clock input being connected to the output of the reference pulse generator, and the output of the logic circuit serving as the output of the ambient light level detector circuit.

4,894,528

LASER BEAM LAWN TENNIS NET REFEREE

Sever Diaconu, and Alen Diaconu, both of P.O. Box 9517, Hickory, N.C. 28603

Filed Jun. 20, 1988, Ser. No. 209,186
Int. Cl.[4] G01V *9/04*; G08B *23/00*
U.S. Cl. 250—222.1 **5 Claims**

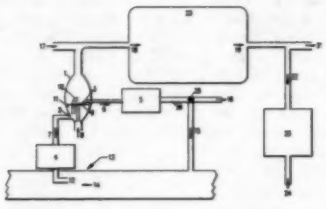
1. A monitoring system for net faults in a net game, wherein said net game comprises a court with a central net, said net having two ends and an upper edge and having a lowered net center, said system comprising two pairs of radiation sources, each pair being positioned on an opposite side of the court from the other pair, wherein the radiation sources in each pair are positioned on opposite sides of the upper edge of the net from one another, with each radiation source positioned higher than the net and projecting a radiation beam at a downward angle from near one end of the net to a receiver near the other end of the net, said beam extending parallel to the upper edge of the net between the source and the lowered net center.

4,894,529

REAL-TIME PARTICLE COUNTER FOR LIQUIDS WITH NEBULIZER AND DRYER

Peter G. Borden, Palo Alto, and Jon Munson, Sunnyvale, both of Calif., assignors to High Yield Technology, Inc., Mountain View, Calif.

Filed Nov. 3, 1988, Ser. No. 267,205
Int. Cl.[4] G01V *9/04*
U.S. Cl. 250—222.2 **11 Claims**



1. A particle detector apparatus for detecting contaminant particles in a liquid comprising:

a source of a liquid to be monitored;

a nebulizer for aspirating said liquid to form an aerosol of droplets containing particles;

means for directing said liquid from said source to said nebulizer;

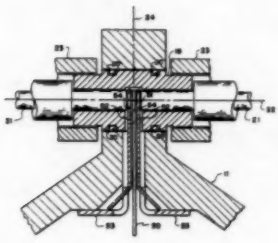
a drying chamber coupled to said nebulizer for evaporating said aerosol droplets to separate said particles in said chamber; and

a particle counter coupled to said drying chamber for counting and sizing said particles.

4,894,530
FIBER OPTIC SNAP ACTING SWITCH

Robert D. Kitchen, Johnson City, Tenn., assignor to Honeywell, Inc., Minneapolis, Minn.

Filed Mar. 31, 1987, Ser. No. 32,798
Int. Cl.[4] H01J 5/16
U.S. Cl. 250—227 5 Claims



1. A fiber optic snap switch comprising:

a housing adapted to hold the ends of a pair of optical fibers in substantial alignment with an axis and with opposing end faces of the fiber on opposite sides of and parallel with a plane transverse to the axis, the end faces being separated by a gap, said housing being formed so as to define first and second nonparallel stop surfaces, each stop surface extending between first and second edges, the second edge being located further from the axis than the first edge, the first edges of the first and second stop surfaces being spaced further apart than the second edges thereof;

a carrier having a first portion located between the first and second stop surfaces and being movable in said plane between first and second positions in which the first portion thereof contacts the first and second stop surfaces respectively;

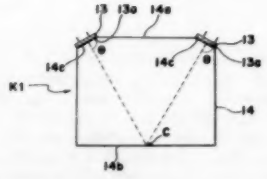
a shutter fixed to said carrier and having a light blocking portion in said plane positioned for movement into and out of the gap between opposing end faces of the optical fibers as said carrier is moved to its first and second positions respectively; and

an over center snap acting mechanism including an actuator plunger operable to bias said carrier toward the first or second stop surfaces, depending on the plunger position.

4,894,531
PHOTODETECTOR FOR RECEIVING AN INDEX SIGNAL OF A BEAM-INDEX CATHODE-RAY TUBE

Katsumi Terada, and Tetsuya Enomoto, both of Hirakata, Japan, assignors to Sanyo Electric Co., Ltd., Moriguchi, Japan

Filed Oct. 13, 1987, Ser. No. 106,847
Claims priority, application Japan, Oct. 17, 1986, 61-247911
Int. Cl.[4] H01J 29/10
U.S. Cl. 250—227 3 Claims



1. In a photodetector including a planar light guide of a quadrilateral shape in which organic phosphor is dispersed in a transparent shape in which organic phosphor is dispersed in a transparent support material, and a pair of photoelectric conversion elements such that light having a wavelength range for exciting said organic phosphor is introduced into said light guide and light generated from said organic phosphor upon excitation of said organic phosphor is guided to said photoelectric conversion elements, with said photoelectric conversion elements being sensitive to a wavelength of the light generated from said organic phosphor, the improvement comprising:

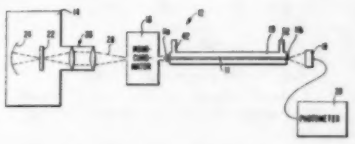
said light guide being formed, at opposite end portions of one side thereof, with a pair of light emitting end surfaces, wherein said light emitting end surfaces are formed by obliquely cutting off the opposite end portions of the one side of said light guide;

said photoelectric conversion elements being, respectively, provided at said light emitting end surfaces such that a light receiving surface of each of said photoelectric conversion elements confronts each of said light emitting end surfaces, and wherein said light emitting end surfaces are formed to have a geometric relationship with a lower side of said light guide, opposite said one side, such that a line extending from the center of the lower side of the light guide to each photoelectric conversion element is generally perpendicular to and substantially bisects each light receiving surface of each photoelectric conversion element, in order to raise a detection level of an index beam in the vicinity of the center of the lower side of the light guide.

4,894,532
OPTICAL FIBER SENSOR WITH LIGHT ABSORBING MOISTURE-SENSITIVE COATING

Steven H. Peterson, Murrysville; Alfred R. Pebler, Wilkinsburg; Rajender K. Sadhir, Plum Boro; Henry A. Pearce Jr., Stoneboro, and C. Clair Claiborne, Sharpsville, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 28, 1988, Ser. No. 173,897
Int. Cl.[4] H01J 5/16, 40/14
U.S. Cl. 250—227 23 Claims



1. A method for sensing changes in moisture condition in a fluid environment comprising:

placing an optical fiber having a moisture sensitive coating thereon in a fluid environment where changes in moisture conditions are to be sensed,

said coating being capable of undergoing a change in its light absorption properties depending upon the degree of moisture in the fluid environment;

causing light to be transmitted through said fiber; and

detecting changes in the spectra of the light transmitted through the fiber as a function of changes in the moisture conditions in the environment.

4,894,533

OPTICAL ROTARY ENCODER

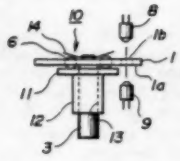
Hiraku Abe, 8-1-305 Koinaba-cho; Yoji Shimojima, 83-4 Aza-Kanagorin, Inaba, and Yoshihiro Takahashi, 93-2 Aza-Kanagorin, Inaba, all of Furukawa-shi, Miyagi-ken, Japan

Continuation of Ser. No. 915,735, Oct. 6, 1986, abandoned. This application Jul. 15, 1988, Ser. No. 220,998

Claims priority, application Japan, Oct. 7, 1985, 60-152469[U]

Int. Cl.[4] G01D 5/34

U.S. Cl. 250—231 SE 2 Claims



1. An optical rotary encoder comprising:

a code plate mounted at its center on a rotatable shaft and having a plurality of indicia portions arranged circumferentially at one radial position thereon, retaining means formed in said code plate, and a click member retained by said retaining means so as to project from a surface of said code plate;

a light emitting element and a light receiving element mounted to a stationary part of said encoder such that light emitted by said light emitting element irradiates said indicia portions of said code plate rotated with said shaft and is provided therefrom to said light receiving element in order to derive position signals indicating corresponding rotational positions of said code plate; and

a stationary plate mounted in said encoder facing opposite the surface of said code plate having said click member projecting therefrom, said stationary plate having a plurality of recesses formed therein engageable by said click member, said recesses being positioned on the stationary plate in correspondence with definite rotational positions of said code plate to be indicated by the position signals derived from said indicia portions of said code plate,

wherein said retaining means includes perforations formed through said code plate at another radial position different from that of said indicia portions, and said click member includes balls held in said perforations, and further comprising a spring plate mounted on said shaft on one side of said code plate for resiliently biasing said balls to project from the other side of said code plate in engagement with said recesses of said stationary plate.

4,894,534

LOGGING APPARATUS AND METHOD

William C. Paske, Pearland, and Richard F. Roesler, Houston, both of Tex., assignors to Baroid Technology, Inc., E. Harris County, Tex.

Continuation-in-part of Ser. No. 872,949, Jun. 11, 1986, Pat. No. 4,829,176. This application Jan. 16, 1987, Ser. No. 4,107

The portion of the term of this patent subsequent to May 9, 2006, has been disclaimed.

Int. Cl.[4] G01V 5/12

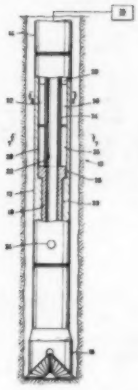
U.S. Cl. 250—254 34 Claims

1. Apparatus for measuring downhole parameters in a borehole, comprising:

a. a generally elongate housing having a longitudinal axis;

b. a source of gamma radiation carried by said housing so that radiation from said source may be emitted outside said housing; and

c. radiation detection means carried by said housing and comprising first and second pairs of detectors, said first pair of detectors including first and second detectors positioned diametrically opposite each other on opposite sides of said longitudinal axis of said housing, and said second pair of detectors including third and fourth detectors positioned diametrically opposite each other on opposite sides of said longitudinal axis of said housing such that



the configuration of the combination of said first pair of detectors and said radiation source is different from the configuration of the combination of said second pair of detectors and said radiation source;

d. said detectors being for sensing radiation from the environment of said housing due to radiation emitted from said radiation source and interacting with said environment.

4,894,535

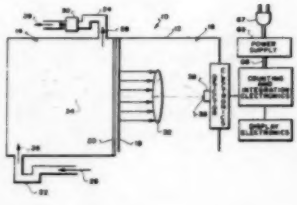
RADON GAS DETECTOR

Peter A. Madnick, 627 Valley Oak La., Thousand Oaks, Calif. 91360, and Russell W. Sherwood, 3719 N. Wells, Kingman, Ariz. 86401

Filed Oct. 3, 1988, Ser. No. 251,793

Int. Cl.[4] G01V 5/00

U.S. Cl. 250—255 8 Claims



1. A radon gas detector comprising:

a housing having an interior chamber, said interior chamber being completely closed to ambient light, said interior chamber being divided into an environment connecting chamber and a radiation ascertaining chamber;

radiation sensitive means mounted between said environment connecting chamber and said radiation ascertaining chamber;

air movement means mounted in connection with said environment connecting chamber, said air movement means for moving ambient air through said environment connecting chamber;

electronic means for detecting radiation within the air which is passing through said environment connecting chamber, said electronic means also including radiation counting means, said electronic means producing an output based on the type and quantity of radiation in said environment connecting chamber; and

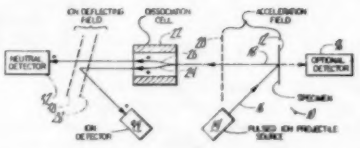
display electronics for receiving said output and displaying accordingly a display representative of the amount and type of radiation located within said environment connecting chamber and hence within the ambient air.

4,894,536

SINGLE EVENT MASS SPECTROMETRY

Robert J. Conzemius, Ames, Iowa, assignor to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed Nov. 23, 1987, Ser. No. 124,023
Int. Cl.[4] H01J *49/26*
U.S. Cl. 250—287 **30 Claims**



1. A single event time of flight mass spectrometer for analysis of a specimen material, the single event being the evolution of a molecular formulation from the same bombarding primary projectile into a secondary particle and subsequent fragmentation into component formulations, comprising:

pulsed projectile source means for imposing on the order of single pulsed primary projectiles on a small localized area on the specimen to induce a corresponding emission of on the order of single, temporally isolated secondary ion particles from the small, localized area, the intensity of the pulsed projectile source being controlled so that each pulse of the pulsed projectile source produces only a very small number, generally on the average between zero and one, of primary projectiles;

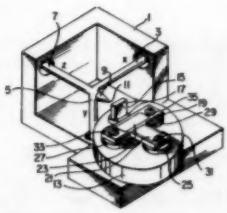
detector means for individually detecting and timing the arrival of the secondary particles.

4,894,537

HIGH STABILITY BIMORPH SCANNING TUNNELING MICROSCOPE

Bradford L. Blackford; Douglas C. Dahn, and Manfred H. Jericho, all of Nova Scotia, Canada, assignors to Canadian Patents & Development Ltd., Ottawa, Canada

Filed Jul. 21, 1988, Ser. No. 222,623
Int. Cl.[4] H01J *37/00*
U.S. Cl. 250—306 **7 Claims**



1. A scanning tunneling microscope, comprising:

a support block made of an electric and thermal conductive metal, and having three orthogonal walls, each having a flanged hole therein,

adjustable sample holding means adjustably positioned on the said support block to carry a sample thereon,

tunneling tip means comprising an electrically conductive tunneling tip and x, y and drive arms, the latters of which are made of hollow tubes of the same metal as that of the said support block and oriented along three orthogonal x, y and z axes respectively, the said x, y and z drive arms being joined together at one end of each arm and carrying the said tunneling tip thereat, the said tip being oriented along the z axis and positioned at a predetermined distance away from the said sample to produce a tunneling current therebetween,

three bimorph disks, each being clamped at its perimeter in the said flanged hole and connecting the said support block and each of the x, y and z drive arms at the other end thereof, for relative movements therebetween along the axis thereof, and

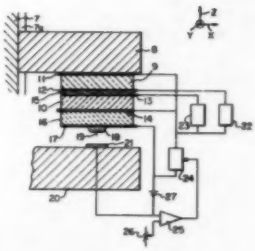
electrical means connected to the said three bimorph disks to control the said relative movements along x, y and z axes.

4,894,538

SCANNING DEVICE FOR SCANNING TUNNELING MICROSCOPE

Masashi Iwatsuki; Kimio Ohi; Kazuma Suzuki, and Kiyoshi Miyashita, all of Tokyo, Japan, assignors to Jeol Ltd., Tokyo, Japan

Filed Mar. 25, 1988, Ser. No. 173,066
Int. Cl.[4] H01J *37/26*
U.S. Cl. 250—306 **4 Claims**



1. In a scanning tunneling microscope having a scanning device and a probe tip whose front end is located close to a sample surface that is maintained in the xy-plane of a rectangular coordinate system consisting of x-, y-, and z-axes, the front end of the tip being maintained parallel to the z-axis, the scanning device causing the tip to make two-dimensional scans of the sample surface while a voltage is applied between the sample and the tip to produce a tunneling current between them, the microscope acting to obtain information about the sample surface from the tunneling current, the scanning device comprising two drivers, which, when a voltage is applied to them, expand or contract along the x- and y-axes, respectively, and each of which consists of a piezoelectric or electrostrictive element,

the improvement wherein the two drivers are stacked on top of each other and each shaped into a sheet, and wherein, when a voltage is applied across each driver, a strain is produced parallel to the surface of the driver.

4,894,539

LEAK DETECTOR

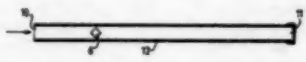
James A. Hurst, Stockton-on-Tees, England, assignor to Imperial Chemical Industries PLC, London, England

Continuation of Ser. No. 88,359, Aug. 24, 1987, abandoned. This application May 16, 1989, Ser. No. 352,611

Claims priority, application United Kingdom, Aug. 22, 1986, 8620500

Int. Cl.[4] G21H 5/02

U.S. Cl. 250—303 5 Claims



1. A method for determining the position of a leak in a pipeline or conduit which comprises

(i) providing within the pipeline or conduit a carrier body housing a radioactive isotope sealably enclosed within it, said carrier body being of a size and a shape such as to enable it to move freely along said pipeline or conduit;

(ii) providing radiation detection means for scanning the pipeline or conduit to determine the progress and location therein of the radioisotope housed within the carrier body;

(iii) pressuring up the pipeline or conduit from a first end with the second end closed and determining the location of cessation of the movement of the carrier body with said radiation detection means; and

(iv) opening up the closed end of the pipeline or conduit to detect movement of the carrier body towards said closed end to indicate that said cessation of movement is due to a leak and not to a constriction in the pipeline or conduit.

4,894,540

IMAGE FORMING METHOD USING SECONDARY ELECTRONS FROM OBJECT FOR NOISE ELIMINATION

Fumio Komatsu, Fuchu, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 14, 1988, Ser. No. 257,557

Claims priority, application Japan, Oct. 14, 1987, 62-259208

Int. Cl.[4] G21K 1/00

U.S. Cl. 250—307 12 Claims

1. An image forming method comprising:

the first step of irradiating a primary beam, having a beam diameter, onto an object, using an intensity corresponding to an image area onto which the beam was irradiated as the intensity of a pixel at the center of said image area, and scanning a beam throughout an inspection area of said object to obtain an image within said inspection area as a collection of pixels arranged at intervals smaller than the beam diameter; and

the second step of assigning a pixel of said collection of pixels to be processed and neighboring pixels with coefficients in accordance with a secondary beam intensity distribution, multiplying the intensity of each pixel by each assigned coefficient, determining a new intensity of said pixel to be processed in accordance with the sum of the respective products, and repeating the new intensity determining process for pixels to be processed.

4,894,541

APPARATUS UTILIZING CHARGED-PARTICLE BEAM

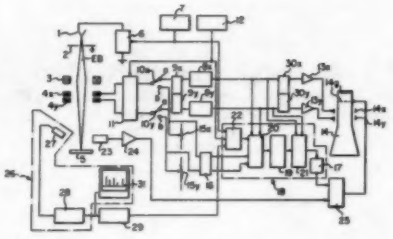
Akishige Ono, Tokyo, Japan, assignor to JEOL Ltd., Tokyo, Japan

Filed Jul. 28, 1988, Ser. No. 225,342

Claims priority, application Japan, Jul. 31, 1987, 62-192098

Int. Cl.[4] H01J 37/256

U.S. Cl. 250—310 4 Claims



1. An apparatus utilizing a charged-particle beam for scanning a specimen in a two-dimensional manner and displaying an image of the specimen based upon x-rays or backscattered electrons emitted from the specimen on a display device having a viewing screen, said apparatus comprising:

a position-specifying means for specifying a desired position within the image of the specimen and displaying that position as a first mark upon the viewing screen;

a means for fixing the charged-particle beam on the position specified by the position-specifying means;

a means for switching the accelerating voltage at which the beam is accelerated to at least one other value;

a means for receiving the at least one other value of the accelerating voltage;

a means for detecting the x-rays or backscattered electrons emitted from the specimen in response to the irradiation of the fixed beam;

a means for receiving the mean atomic number of the irradiated portion of the specimen; and

a second mark display means which superimposes a second mark indicating the position and the size of an analyzed region on the image of the specimen displayed on the viewing screen according to information indicating the accelerating voltage and information indicating the mean atomic number of the specimen.

4,894,542

BROADBAND SUPERCONDUCTING DETECTOR

Richard T. Schneider, Alachua, Fla., assignor to Progress Technology Corporation, St. Petersburgh, Fla.

Filed Dec. 23, 1987, Ser. No. 137,131

Int. Cl.[4] H01L 39/00; G01J 5/00

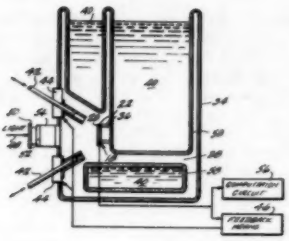
U.S. Cl. 250—336.2 23 Claims

1. A broadband photon detector comprising:

superconducting material such that at least within a given range incident photons increase the temperature of said material and the resistivity of said material varies in accordance with the temperature of said material;

means for maintaining said material at a temperature within said given range using blackbody radiation that an in-

crease in temperature of said material will cause an increase in the resistivity of said material; and



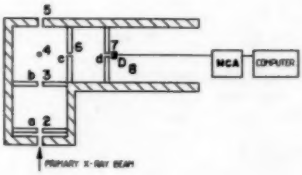
means for sensing an increase in the resistivity of said material.

4,894,543

METHOD FOR MEASURING X-RAYS OR GAMMA RADIATION AND DEVICE FOR THIS

Roland Ribberfors, Allmogegatan 92, Linköping, Sweden (S-583 30), and Georg Matscheko, Drottninggatan 41, Linköping, Sweden (S-582 27)

Filed Mar. 3, 1988, Ser. No. 163,545
Int. Cl.[4] G01T 1/16
U.S. Cl. 250—336.1 **14 Claims**



8. A device for use in measuring a high-energy electromagnetic radiation beam traveling along a path by means of Compton scattering, comprising:

a chamber enclosing at least a portion of said beam;

a scattering element disposed in the beam path, so as to scatter the beam, including at least one of said filament and said rod, having a length substantially greater than its cross-sectional dimensions at a point where the beam is scattered toward a detector;

a detector arranged in the same plane with the radiation beam and a cross-section of the scattering element and disposed at an angle to the beam path to measure radiation scattered by said scattering element; and

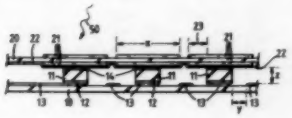
said scattering element having a longitudinal axis extending generally perpendicular to said plane and having a cross-section in the plane of dimensions substantially less than the length of the scattering element so as to scatter a portion of the beam toward the detector, the scattered portion having a spectrum indicative of the spectrum of the radiation beam, whereby the spectrum of the beam may be reconstructed from the spectrum of the scattered radiation.

4,894,544

ARRAYS OF INFRARED DETECTOR ELEMENTS

Andrew A. Turnbull, Reigate, England, assignor to U.S. Philips Corp., New York, N.Y.

Filed Jan. 14, 1988, Ser. No. 206,648
Claims priority, application United Kingdom, Jul. 10, 1987, 8716238
Int. Cl.[4] G01J 5/06
U.S. Cl. 250—338.3 **12 Claims**



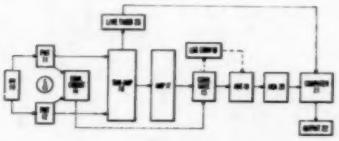
1. An array of infrared detector elements mounted on a support, each element comprising a capacitor formed by a body of pyroelectric or ferroelectric material between a front electrode and a back electrode at respective front and back major faces of the body, which back major face faces the support, the elements having individual electrical connections to their back electrode from which there are derived electrical signals which differ as the temperature of the body changes in response to incident infrared radiation, which individual electrical connections are provided by a pattern of conductors carried by the support, each element having at least an infrared-collection area of larger lateral dimensions than the portion of the electrical connection to the back electrode which underlies the back electrode whereby a peripheral part of each element overhangs and is separated vertically from an underlying part of the support, characterised in that the elements are arranged in a 2-dimensional array with inner elements of the array surrounded by outer elements of the array, and in that the conductors which provide said individual electrical connections to the inner detector elements extend on a part of the support between the outer detector elements and below the overhanging peripheral parts of these outer elements.

4,894,545

LIQUID SCINTILLATION COUNTING

Charles L. Dodson, Orange, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Filed Oct. 27, 1988, Ser. No. 263,067
Int. Cl.[4] G01T 1/208, 1/00
U.S. Cl. 260—364 **19 Claims**



1. A method for determining radioactivity in a liquid scintillation counter comprising:

a. obtaining count rates for a standard sample for multiple channels of a multichannel analyzer over at least part of the spectrum of the standard sample;

b. determining the counting efficiencies for multiple channels of the analyzer;

c. obtaining count rates for an unknown sample for multiple channels of the multi-channel analyzer over at least part of the spectrum of the unknown sample;

d. determining a regression equation from the integrated count rates of the unknown sample and the counting efficiencies of the standard sample;

e. selecting a region of the spectrum of the unknown sample

to obtain a selected modified regression equation reducing error below a predetermined level; and

f. extrapolating the modified regression equation to provide the activity of the unknown sample.

4,894,546

HOLLOW CATHODE ION SOURCES

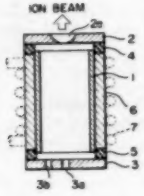
Ryota Fukui, Fujisawa; Kenichi Takagi; Riichi Kikuchi, both of Chigasaki; Kazuo Takayama, Machida, and Akira Tonegawa, Hatano, all of Japan, assignors to Nihon Shinku Gijutsu Kabushiki Kaisha, Kanagawa, Japan

Filed Mar. 7, 1988, Ser. No. 164,803

Claims priority, application Japan, Mar. 11, 1987, 62-54110; Feb. 3, 1988, 63-22065

Int. Cl.[4] H01J *27/00*

U.S. Cl. 250—423 R **12 Claims**



1. A hollow cathode ion source comprising a cylindrical cathode having a diameter at least about half its length, a first anode provided on one end of said cylindrical cathode and having an ion extraction opening, a second anode provided on the other end of said cylindrical cathode and having at least one opening for introducing a gaseous medium, a discharge means between said cylindrical cathode and each of said first and second anodes to ionize said gaseous medium to produce ions which are extracted through said ion extraction opening in the axial direction of said cylindrical cathode, and means for cooling said cathode.

4,894,547

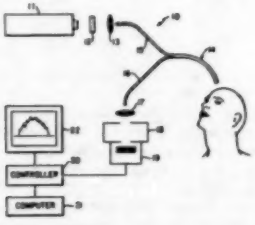
OPTICAL METHOD AND APPARATUS FOR DETECTING AND MEASURING AGING, PHOTOAGING, DERMAL DISEASE AND PIGMENTATION IN SKIN

David J. Leffell, Ann Arbor, Mich., and Lawrence Deckelbaum, Woodbridge, Conn., assignors to Yale University, New Haven, Conn.

Filed Sep. 28, 1987, Ser. No. 101,944

Int. Cl.[4] G01N *33/16*; A61B *5/00*

U.S. Cl. 250—461.2 **29 Claims**



12. A method for inducing naturally occurring fluorescence in untreated human skin, in vivo, comprising the steps of:

developing laser light energy of a predetermined ultraviolet band wavelength; and

directing said laser light energy to an area of untreated skin to be induced to endogenous fluorescence.

4,894,548

RADIATION IMAGE RECORDING AND REPRODUCING METHOD AND RADIATION IMAGE STORAGE PANEL EMPLOYED FOR THE SAME

Kenji Takahashi; Takashi Nakamura, and Yuichi Hosoi, all of Kaisei, Japan, assignors to Fuji Photo Film Co., Ltd., Minami, Japan

Continuation of Ser. No. 47,596, May 19, 1987, abandoned, which is a continuation of Ser. No. 723,873, Apr. 16, 1905, abandoned. This application Jan. 19, 1988, Ser. No. 147,572

Claims priority, application Japan, Apr. 17, 1984, 59-77226

Int. Cl.[4] C09K *11/61*

U.S. Cl. 250—484.1 **16 Claims**

1. A radiation image recording and reproducing method comprising steps of:

(i) causing a divalent europium activated complex halide phosphor having the formula (I):

$$M^{II}X_{2\cdot a}M^{II}X'_{2\cdot b}MgX''_{2\cdot x}Eu^{2+} \quad (I)$$

in which M^{II} is at least one alkaline earth metal selected from the group consisting of Ba, Sr and Ca; each of X and X' is at least one halogen selected from the group consisting of Cl, Br and I, and $X \neq X'$; X'' is at least one halogen selected from the group consisting of F, Cl, Br and I; and a, b and x are numbers satisfying the conditions of $0.1 \leqq a \leqq 10.0$, $2\times10^{-5} \leqq b \leqq 2\times10^{-2}$ and $0 < x \leqq 0.2$, respectively, to absorb a radiation having passes through an object or having radiated from an object;

(ii) exposing said stimulable phosphor to an electromagnetic wave having a wavelength within the range of 450–1000 nm to release the radiation energy stored therein as light emission; and

(iii) detecting the emitted light.

4,894,549

APPARATUS FOR DEMAGNIFICATION OR FULL-SIZE ION PROJECTION LITHOGRAPHY

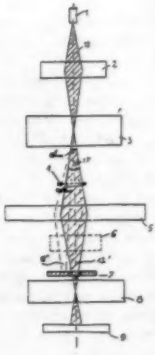
Gerhard Stengl, Kärnten, Austria, assignor to IMS Ionen Mikrofabrikations Systeme Gesellschaft m.b.H., Vienna, Austria

Filed Mar. 4, 1988, Ser. No. 164,106

Claims priority, application Austria, Mar. 5, 1987, 507/87

Int. Cl.[4] H01J *27/00*

U.S. Cl. 250—492.2 **18 Claims**



1. An apparatus for demagnification or full-size ion projection lithography, comprising:

an ion source for projecting an ion beam along a path;

a structured mask disposed along said path;

an image plane disposed along said path and receiving an image of the structure of said mask projected onto the image plane by said ion beam;

an immersion lens between said mask and said image plane along said path for focussing said ion beam and forming a crossing point for ion rays thereof;

a projection lens along said path;

a Wien ExB mass-separation filter along said path between the source and the mask; and

a diaphragm cooperating with said Wien ExB mass-separation filter and provided with an aperture passing a predetermined kind of ions generated by said source and intercepting ions different from said predetermined kind upon deflection by said filter, said diaphragm being positioned between said immersion lens and said image plane at a distance from said Wien ExB mass-separation filter so as to substantially reduce the distortion caused by the diffraction of said filter.

4,894,550

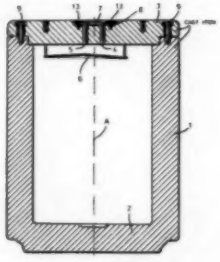
SHIELDED RADIOACTIVE-WASTE CONTAINER

Henning Baatz, and Dieter Rittscher, both of Essen, Fed. Rep. of Germany, assignors to GNS Gesellschaft fur Nuklearservice MBH, Essen, Fed. Rep. of Germany

Filed Jun. 17, 1983, Ser. No. 505,227

Int. Cl.[4] G21F *5/00*

U.S. Cl. 250—506.1 **4 Claims**



1. A shielded container for the treatment of radioactive waste, the container comprising:

an upwardly open cast-iron vessel having a closed bottom, solid walls unitary therewith, and an open upper mouth, said vessel having a smooth outer surface shaped to interfit with a heater;

a cast-iron lid sealingly engaged over and completely blocking the mouth, the lid being formed with separate vertically throughgoing intake and outlet passages;

means including screwthread formations for hermetically securing the lid over the mouth;

a flow deflector aligned inside the vessel and spaced directly underneath the outlet passage, said deflector being a horizontal plate;

a single unitary cover sealingly engageable on the lid over both the passages; and

means including screwthread formations for hermetically engaging the cover over the passages.

4,894,551

SECTIONAL FORM MEASURING APPARATUS

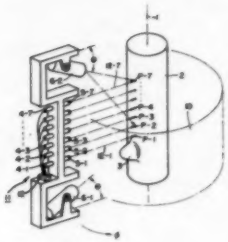
Hideo Kishimoto, Chofu; Hirohisa Tsubakimoto, Hachiouji, and Takao Nakajima, Chofu, all of Japan, assignors to Anima Corporation, Chofu, Japan

Filed May 26, 1988, Ser. No. 199,271

Claims priority, application Japan, Jun. 5, 1987, 62-139655; Jun. 5, 1987, 62-139656; Jun. 5, 1987, 62-139657; Jun. 30, 1987, 62-161371

Int. Cl.[4] G01N *21/86*; G01B *11/24*

U.S. Cl. 250—560 **10 Claims**



1. Sectional form measuring apparatus, comprising in combination:

a plurality of light sources for irradiating an object positioned on a reference axis with irradiation directed toward a plurality of positions on the reference axis, said light sources and said object being relatively rotatable, about said reference axis, comprising in combination, lenses mounted on the light sources to focus irradiated light from said light sources on the surface of said object, a plurality of detectors located at different positions respectively for receiving reflected light from the surface of said measuring object from at least a portion of the light sources, means for separately measuring distances from said reference axis to the surface of said object in response to detected signals from the respective detectors, and means for producing sectional forms of said object along said reference axis obtained at a plurality of positions on said reference axis from the detected signals in response to relative rotation about the reference axis.

4,894,552

DIFFERENTIAL-REFLECTANCE PHOTOMETER

Helmut Gassenhuber, Starnberg, and Walter Ziegler, Munich, both of Fed. Rep. of Germany, assignors to LRE Relais & Elektronik GmbH, Munich, Fed. Rep. of Germany

Filed Aug. 4, 1988, Ser. No. 228,260

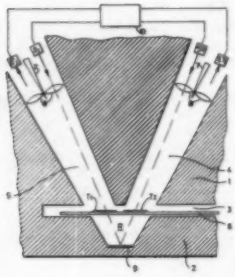
Claims priority, application Fed. Rep. of Germany, Aug. 21, 1987, 8711377

Int. Cl.[4] G01N *21/88*

U.S. Cl. 250—572 **3 Claims**

1. A differential-reflectance photometer for quantitatively evaluating test strips, especially for chemical analysis, characterized in that two channels, each containing an optical emitter and receiving arrangement, are provided in a housing and are arranged to form a V, that at the apex of the V the two channels enter a common space, that on the bottom of the common space is provided a reference field associated with both of the optical emitting and receiving arrangements, that the two optical emitting and receiving arrangements are connected with a common evaluating apparatus, and that between the reference field and the emitting and receiving arrangements of the two channels is a receiving slot for a test strip having two test fields associated respectively with the channels and which receiving slot intersects both of the channels, whereby when a test strip is positioned in said slot each of said two optical emitting and receiving arrangements is responsive to the light

reflected from the associated one of said two test fields and whereby when a test strip is not positioned in said slot each of



said two optical emitting and receiving arrangements is responsive to the light reflected from said reference field.

1

4,894,553

ENGINE STARTING AND CHARGING DEVICE

Kazutoshi Kaneyuki, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

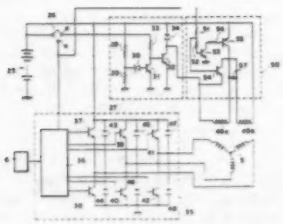
PCT No. PCT/JP88/00127, § 371 Date Oct. 6, 1988, § 102(e) Date Oct. 6, 1988, PCT Pub. No. WO88/06377, PCT Pub. Date Aug. 25, 1988

PCT Filed Feb. 9, 1988, Ser. No. 265,860

Claims priority, application Japan, Feb. 12, 1987, 62-30022

Int. Cl.[4] H02K *17/12, 17/42*

U.S. Cl. 290—31 6 Claims



1. An engine starting and charging device, comprising: revolving-field poles mounted on a crankshaft of engine; field coils which are divided in the plural number and wound about a field core secured to an engine body and excite said revolving field poles; an armature core secured on said engine body and an armature coil wound thereabout; a crank angle detector which detects the angle of rotation of said revolving-field poles; an armature current changeover circuit which changes the direction of the electric current flowing into said armature coil in accordance with an output signal produced by said crank angle detector such that, at the time of engine starting, said armature coil will form a revolving field having a specific phase difference in relation to the field of said revolving-field poles; a rectifying means which converts the voltage produced by said armature coil into the direct current after engine starting; and a field coil control circuit which connects in parallel said field coils that have been divided in the plural number described above, at the time of engine starting, and in series after engine starting.

4,894,554

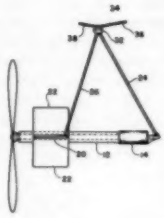
CABLE SUSPENDED WINDMILL

Moses G. Farmer, Hampton, Va., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Sep. 15, 1988, Ser. No. 246,594

Int. Cl.[4] F03D *9/00*

U.S. Cl. 290—55 21 Claims



1. A windmill apparatus comprising:

an airframe having an upwind end and a downwind end;

a first rotor rotatably mounted on the airframe;

a generator supported by the airframe and being operatively connected to the rotor;

ground based support means for supporting the airframe in a vertically elevated disposition; and

suspension means for suspending the airframe from the support means.

4,894,555

BRAKE CONTROL SYSTEM AND METHOD FOR A VEHICLE

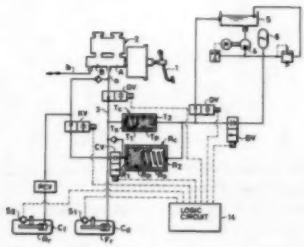
Namio Watanabe; Kinji Ogino, and Satomi Ookubo, all of Saitama, Japan, assignors to Akebono Brake Industry Co., Ltd., Tokyo, Japan

Filed Nov. 19, 1987, Ser. No. 122,999

Claims priority, application Japan, Nov. 21, 1986, 61-276450; Dec. 16, 1986, 61-297798

Int. Cl.[4] B60T *8/32*

U.S. Cl. 303—113 5 Claims



1. A brake control system for use in a motor vehicle, comprising:

a master cylinder generating a fluid pressure for a brake;

a brake device having a wheel cylinder;

a fluid passage communicating said master cylinder with said wheel cylinder;

a gate valve of a normally open type provided at said fluid passage, said gate valve closing during the skid-preventing control of a wheel and the acceleration slip-preventing control of a driving wheel;

a compression cylinder device provided at said fluid passage between said gate valve and said wheel cylinder, said

compression cylinder device having a compression piston reciprocately disposed therein, said compression piston dividing an inside of said compression cylinder device into a fluid supply chamber communicating with said fluid passage and a rear chamber;

a decompression cylinder device provided at said fluid passage between said gate valve and said wheel cylinder, said decompression cylinder device having a decompression piston disposed therein, said decompression piston dividing an inside of said decompression cylinder device into a decompression chamber and a back chamber;

a close valve of a normally close type provided between said decompression chamber and said fluid passage, said close valve being opened by a wheel lock signal;

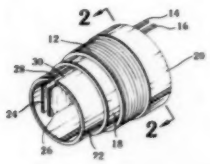
an accumulator accumulating a hydraulic pressure; and a valve system provided between said accumulator and said rear and back chambers of said compression and decompression cylinder devices, said valve system selectively supplying the hydraulic pressure in said accumulator to said rear and back chambers during the skid-preventing control of the vehicle wheel and the acceleration slip-preventing control of the driving wheel.

4,894,556

HYBRID PULSE POWER TRANSFORMER

Mohamed A. Hilal; Jerome F. Parmer; Scott D. Peck, and Eddie M. W. Leung, all of San Diego, Calif., assignors to General Dynamics Corporation, Convair Division, San Diego, Calif.

Filed Jun. 15, 1987, Ser. No. 61,761
Int. Cl.[4] H03K *3/00*; H01F *36/00*
U.S. Cl. 307—106 **6 Claims**



1. A highly efficient high power transformer comprising:

a primary winding formed from a conductor means which has a minimal resistance when in a superconducting first state and high substantially uniform resistance along its length when a second conducting state;

a load:

a secondary winding formed from a normal conductor connected across said load;

means for establishing said primary winding in said first state;

power means for charging said primary winding to its maximum capacity with stored energy while in said first state:

means for changing said primary winding from said first state to said second state; and

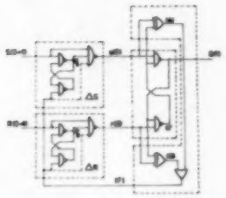
a first and second switch, said first switch in series with said power means which is closed when charging said primary winding and open when discharging said stored energy from said primary winding and said second switch positioned across said primary winding which when open allows said primary winding to become charged and when closed causes said stored energy in said primary winding to be transferred to said secondary winding and said load, said first and second switches are simultaneously switched.

4,894,557

ASYNCRONOUS EDGE-TRIGGERED RS FLIP-FLOP CIRCUIT

Angelo Beltramini, Galliate, Italy, assignor to Montedison S.p.A., Milan, Italy

Filed May 9, 1988, Ser. No. 191,363
Claims priority, application Italy, May 15, 1987, 20536 A/87
Int. Cl.[4] H03K *3/037*
U.S. Cl. 307—291 **13 Claims**



1. An asyncronous flip-flop comprising:

an RS flip-flop output circuit having at least one output Q, at least one set (s) input and at least one reset (r) input, said RS flip-flop circuit being formed by a pair of cross-coupled logical gate circuits, each of which has at least a first input receiving an output signal from the other cross-coupled gate circuit and a second input as a respective one of the set (s) and reset (r) inputs;

a first circuit connected to one of said set (s) and reset (r) inputs and comprising:

means for accepting at least one input signal Xa;

means responsive to a change in state of said one input signal Xa for producing a change in state in an output signal Ya from a rest state to another state, said output signal Ya being coupled with one of said set (s) and reset (r) inputs;

means for accepting at least one feedback signal F representing the output Q of said RS flip-flop,

means responsive to a change in state of said feedback signal F for returning said output signal Ya to its rest state;

a second circuit connected to the other of said set (s) and reset (r) inputs and comprising:

means for accepting at least one input signal Xb;

means responsive to a change in state of said one input signal Xb for producing a change in state of an output signal Yb from a rest state to another state, said output signal Yb being coupled to the other of said set (s) and reset (r) inputs;

means for accepting said at least one feedback signal F representing the output Q of said RS flip-flop, and

means responsive to a change in state of said feedback signal F for returning said output signal Yb to its rest state; and

means for generating said feedback signal F and comprising:

a first XOR gate having an output and first and second inputs respectively coupled to the first and second inputs of one of said cross-coupled gates; and

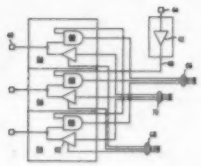
a second XOR gate having an output and first and second inputs respectively coupled to the first and second inputs of the other of said cross-coupled gates; and,

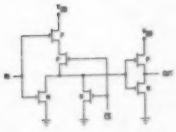
an OR gate having first and second inputs respectively coupled to the outputs of said first and second XOR gates, and an output which supplies said feedback signal F in common to said first and second circuits.

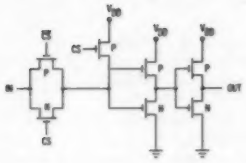
4,894,558
POWER SAVING INPUT BUFFER FOR USE WITH A GATE ARRAY

Cecil Conkle, Palo Alto, Calif.; Masahiko Shoji, and Noriaki Takagi, both of Tokyo, Japan, assignors to NEC Electronics Inc., Mountain View, Calif. and NEC Corporation, Tokyo, Japan

Filed Oct. 11, 1988, Ser. No. 255,227
Int. Cl.[4] H03K *19/096, 19/003, 17/687, 3/013*
U.S. Cl. 307—296.3 7 Claims







1. A device for conserving power in a gate array circuit comprising:

means for supplying a first control signal;

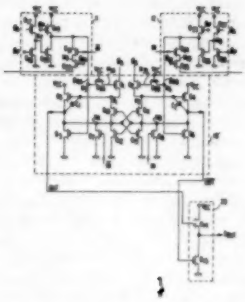
AND gate means having a first input port and a second input port and providing a first output signal, said first control signal being applied to said first input port and a first signal being applied to said second input port, wherein said first output signal is coupled to a gate array means and follows said first signal when said first control signal represents a logical one and represents a logical zero when said first control signal represents a logical zero.

4,894,559
BUFFER CIRCUIT OPERABLE WITH REDUCED POWER CONSUMPTION

Shouji Kaneko, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Sep. 9, 1987, Ser. No. 94,557
Claims priority, application Japan, Sep. 9, 1986, 61-213164
Int. Cl.[4] H03K *17/04, 3/356, 19/01;* G11C *7/00*
U.S. Cl. 307—530 6 Claims

1. A buffer circuit comprising a flip-flop circuit having first and second input terminals, and first and second output terminals; a first boot-strap circuit coupled to said first output terminal, and including a first capacitor and a first precharge circuit for operatively charging said capacitor; a second boot-strap circuit coupled to said second output terminal and including a second capacitor and a second precharge circuit for operatively charging said second capacitor; a first control circuit coupled to said first precharge circuit for enabling said first precharge circuit when said first output terminal is to be made high in level and disenabling said first precharge circuit when said first output terminal is to be made low in level; and a

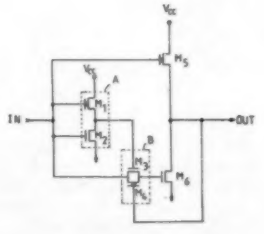


second control circuit coupled to said second precharge circuit for enabling said second precharge circuit when said second output terminal is to be made high in level and disenabling said second precharge circuit when said second output terminal is to be made low in level.

4,894,560
DUAL-SLOPE WAVEFORM GENERATION CIRCUIT

Hyung-Sub Chung, Seoul, Rep. of Korea, assignor to Samsung Semiconductor and Telecommunications Co. Ltd., Gumi, Rep. of Korea

Filed Sep. 16, 1988, Ser. No. 247,048
Claims priority, application Rep. of Korea, Dec. 8, 1987, 87-14053
Int. Cl.[4] H03K *5/12, 17/16*
U.S. Cl. 307—263 3 Claims



1. A dual-slope waveform generation circuit comprising:

a pull-up transistor and a pull-down transistor connected in series with each other, one of said pull-up and pull-down transistors being directly connected to an input signal node, the other of said pull-down and pull-up transistors being connected to the sources of a pair of parallel connected P and N type MOS transistors forming a transmission gate, and a terminal interconnecting said pull-up and pull-down transistors being connected to an output signal node, said transmission gate being controlled sequentially by, first, a delayed and inverted input signal generated by an inverter and, second, an output feedback signal, the drains of said P and N type MOS transistors of said transmission gate being connected to the input signal node; and

the invertor being composed of P and N type MOS transistors connected in series with each other, gates of said P and N type MOS transistors being connected to the input signal node, a source of said P type MOS transistor and a

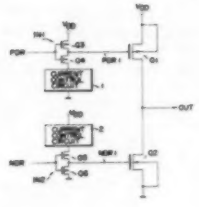
drain of said N type MOS transistor being connected together at an inverter output node, said inverter output node being connected to said transmission gate for controlling the transmission through one of the transistors thereof, a source of said N type MOS transistor of said inverter being connected to ground, and said output signal node being connected to and controlling the transmission through the other of said transmission gate transistors.

4,894,561

CMOS INVERTER HAVING TEMPERATURE AND SUPPLY VOLTAGE VARIATION COMPENSATION

Kazutaka Nogami, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 13, 1988, Ser. No. 256,664
Claims priority, application Japan, Dec. 18, 1987, 62-320416
Int. Cl.[4] H03K *17/14*
U.S. Cl. 307—443 **7 Claims**



1. A semiconductor integrated circuit comprising:
- a pair of P-channel and N-channel MOS output transistors connected in series between a power source voltage node and a ground node;
- a first logic circuit for controlling a gate potential of said P-channel MOS output transistor;
- a first current control circuit for controlling a current flowing into a ground potential path of said first logic circuit;
- a second logic circuit for controlling a gate potential of said N-channel MOS output transistor;
- a second current control circuit for controlling a current flowing into a power source potential path of said second logic circuit; and
- said first and second current control circuits having a current-temperature characteristic and a current-power source voltage characteristic which are inversely proportional to those of said MOS output transistors.

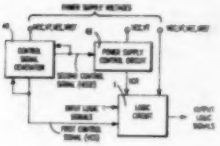
4,894,562

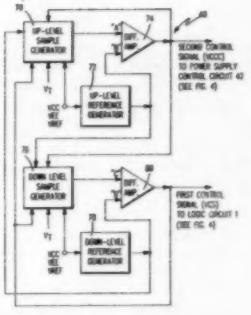
CURRENT SWITCH LOGIC CIRCUIT WITH CONTROLLED OUTPUT SIGNAL LEVELS

Joseph R. Cavaliere, Hopewell Junction, and George E. Smith, III, Wappingers Falls, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 3, 1988, Ser. No. 252,489
Int. Cl.[4] H03K *19/086, 19/003, 17/14, 17/16*
U.S. Cl. 307—455 **20 Claims**

1. A logic circuit network for producing an adjustable first logic level and a different adjustable second logic level in response to at least one input signal, comprising:
- a logic circuit having at least one input terminal, at least one output terminal, at least one power supply terminal for receiving power, circuit components having parameters and a first control terminal;
- a control circuit coupled to the logic circuit and having a second control terminal;
- means for independently generating a first control signal and a second control signal responsive to changes in the power supply, temperature and logic circuit component parameters; and
- means for supplying the control signals to the first and second control terminals, respectively, so as to maintain the first and second logic levels at different predetermined





reference levels despite changes in the power supply, temperature and logic circuit component parameters.

4,894,563

OUTPUT MACROCELL FOR PROGRAMMABLE LOGIC DEVICE

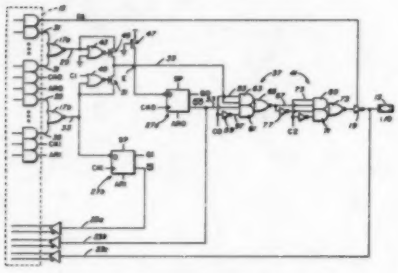
Keith H. Gudger, Sunnyvale, Calif., assignor to Atmel Corporation, San Jose, Calif.

Filed Oct. 11, 1988, Ser. No. 256,915
Int. Cl.[4] H03K *19/177*
U.S. Cl. 307—465 **15 Claims**

1. An output macrocell for a programmable logic device comprising,
- an input/output pin connectable to an external but for transferring data into and out of the programmable logic device,
- an output buffer connected to said pin,
- a product term programmable output enable means connected to said output buffer for selectively enabling data placed in said output buffer to be output to the bus through said input/output pin,
- a dedicated path from said input/output pin to a programmable AND array of the programmable logic device, said dedicated path feeding data output through said input/output pin back to said array whenever said output buffer is enabled, said dedicated path inputting data from said

external bus into said array whenever said output buffer is disabled by said enable means,

a first flip-flop register with an input connected to a first sum term line from said array via a first OR gate and with an output in selectable data communication with said output buffer, said output also connected to a dedicated feedback path to said array, and



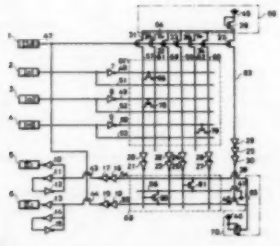
a second flip-flop register with an input connected to a second sum term line from said array via a second OR gate and with an output connected to a feedback path to said array, said second sum term line being selectively connectable to an input of said first OR gate producing said first sum term line.

4,894,564

PROGRAMMABLE LOGIC ARRAY WITH REDUCED PRODUCT TERM LINE VOLTAGE SWING TO SPEED OPERATION

Kazuhiro Sakashita; Takashi Ohya, and Takeshi Hashizume, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 6, 1988, Ser. No. 254,231
Claims priority, application Japan, Oct. 23, 1987, 62-268914
Int. Cl.[4] H03K *17/04, 19/177*
U.S. Cl. 307—465 **6 Claims**



1. A programmable logic array for outputting a logic signal previously programmed in synchronization with a clock signal, comprising:

logic circuit means (67, 68) comprising a plurality of input lines (48–53), a plurality of product term lines (57–60) each provided intersecting with said input lines, and at least one output line (54, 55) provided intersecting with said plurality of product term lines for outputting a logical product signal by connecting transistors (66, 78, 79) to intersections of said plurality of input lines and any of said plurality of product term lines as required, to be programmed, as well as outputting an logical sum signal by connecting transistors (80, 81) to intersections of said plurality of product term lines and at least one output line, to be programmed,

clock gate means (31–34, 39, 40) connected to said plurality of product term lines and said at least one output line, respectively, and responsive to said clock signal to be rendered conductive, and

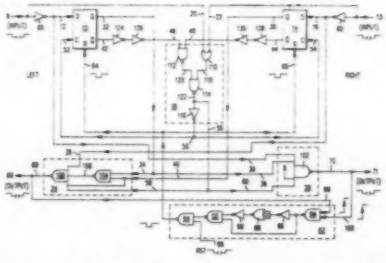
pull-up circuit means (38, 42) comprising first and second conduction terminals and a gate electrode, said first conduction terminal and said gate electrode being connected to power supply terminals (45, 46) and the second conduction terminal being connected to said clock gate means, said pull-up circuit means being responsive to conduction of said clock gate means for precharging said plurality of product term lines and said at least one output line to a potential lower than the power-supply potential.

4,894,565

ASYNCHRONOUS DIGITAL ARBITER

Douglas E. Marquardt, San Jose, Calif., assignor to American Microsystems, Inc., Eastlake, Ohio

Filed Aug. 11, 1988, Ser. No. 231,420
Int. Cl.[4] H03K *5/26, 17/28*
U.S. Cl. 307—518 **16 Claims**



1. An asynchronous arbiter comprising:

first and second input terminals for receiving the asynchronous signals to be arbitrated;

a first flip-flop having an input terminal connected by an inverter to the first input terminal, and having a clock terminal, an output terminal, an inverted output terminal, and a reset terminal;

a second flip-flop having an input terminal connected by an inverter to the second input terminal, and having a clock terminal, an output terminal, an inverted output terminal, and a reset terminal;

a first and second output logic means each having an output terminal and input terminals;

a logic means having input terminals and output terminals;

means connecting each of the first and second input terminals to, respectively, a first and a second input terminal of the logic means;

means connecting the inverted output terminals of the first and second flip-flops to, respectively, a third and a fourth input terminal of the logic means;

means connecting the input terminal of the first flip-flop to a first input terminal of the second output logic means;

means connecting the input terminal of the second flip-flop to a first input terminal of the first output logic means;

means connecting a first output terminal of the logic means to the clock terminals of the first and second flip-flops;

means connecting a second output terminal of the logic means to a second input terminal of, respectively, the first and second output logic means;

means connecting the output terminal of the first flip-flop to a third input terminal of, respectively, the first and second output logic means; and

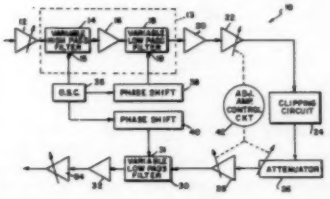
means connecting the output terminal of the second flip-flop to a fourth input terminal of the first output logic means, so the output terminals of the first and second output logic means provide arbitrating signals between the first and second input signals.

4,894,566

NOISE REDUCTION CIRCUIT

Michael J. Rush, R.R. 1, Box 115, Owensburg, Ind. 47453

Filed Oct. 18, 1988, Ser. No. 259,123
Int. Cl.[4] H03K *5/08*
U.S. Cl. 307—542 **12 Claims**



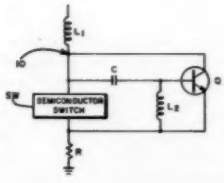
1. A circuit for reducing noise on an electrical signal, comprising a variable band-pass filter having an input to which the noisy electrical signal is coupled, means for repetitively varying the band-pass of the variable band-pass filter through a first frequency range, means for coupling the varying means to the variable band-pass filter, a clipping circuit, means for coupling an output of the variable band-pass filter to an input of the clipping circuit, and the clipping circuit having an output at which a noise reduced electrical signal is produced.

4,894,567

ACTIVE SNUBBER CIRCUIT

Ronald J. Lenk, Albuquerque, N. Mex., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 17, 1988, Ser. No. 258,560
Int. Cl.[4] H03K *17/16, 17/56*
U.S. Cl. 307—542 **1 Claim**



1. Electronic circuit apparatus for actively clamping high frequency ringing on a semiconductor switch having first and second poles where the ringing is due to leakage inductance comprising:

(a) a capacitor having first and second capacitive plates wherein the first capacitive plate is connected to the first pole of the switch;

(b) a bipolar transistor connected at its base to the second capacitive plate, connected at its collector to the first capacitive plate and having its emitter connected to the second pole of the switch; and

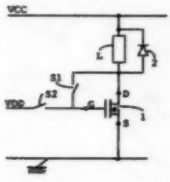
(c) a shunting inductance connected between the base and emitter of the transistor.

4,894,568

GATE CONTROL CIRCUIT FOR A SWITCHING POWER MOS TRANSISTOR

Antoine Pavlin, Aix en Provence, France, assignor to SGS-Thomson Microelectronics S.A., Gentilly, France

Filed Feb. 2, 1989, Ser. No. 305,333
Claims priority, application France, Feb. 4, 1988, 88 01550
Int. Cl.[4] H03K *17/687*
U.S. Cl. 307—584 **5 Claims**



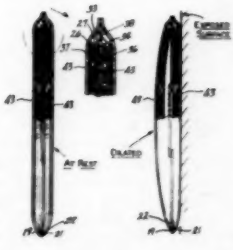
1. A gate control circuit for a power MOS transistor (1), the first main electrode of which (D) is connected to a high current voltage (V_{CC}) through a load (L), the second main electrode of which (S) is grounded and the gate (G) of which is connected, during the switching ON period, to a low voltage source (V_{DD}), comprising switching means (S1) for connecting, at the switching On of said power MOS transistor, said first main electrode to said gate.

4,894,569

ELECTRO-EXPULSIVE SEPARATION APPARATUS

Benjamin G. Lardiere, Jr., Milford, and Joshua I. Goldberg, Woodbridge, both of Conn., assignors to Dutsproducts New England, Inc., Wallingford, Conn.

Filed Jun. 13, 1988, Ser. No. 205,637
Int. Cl.[4] B64D *15/00*; H02K *3/04*
U.S. Cl. 310—10 **9 Claims**



1. An electro-expulsive separation apparatus comprising:

at least two discrete electrical conductors,

a first flexible jacket means surrounding and sealing substantially each conductor separately to define individual packets,

insulator means sandwiched between said packets,

said insulator means being keyed to one of said first jacket means to preclude relative motion between said insulator means and said one of said first jacket means,

a tab portion of each conductor being free of each said first jacket means,

a spot electrical connection between said conductors at said tab portions,

a second flexible jacket means enclosing and sealing said jacketed packets including said tab portions into a unitary flexible package, and,

positive and negative electrodes connected to said conduc-

tors, whereby said jacketed packets are separable partially within said second jacket means to create a void between said jacketed packets in response to repelling forces created by a magnetic field developed when said electrical conductors are energized by an electric current.

4,894,570

COMPACT UNITARY STARTING MOTOR AND CHARGING GENERATOR WITH RECESSED CLUTCH

Kazutoshi Kaneyuki, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

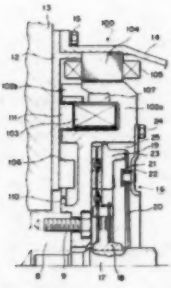
PCT No. PCT/JP88/00126, § 371 Date Oct. 6, 1988, § 102(e) Date Oct. 6, 1988, PCT Pub. No. WO88/06369, PCT Pub. Date Aug. 25, 1988

PCT Filed Feb. 9, 1988, Ser. No. 265,867

Claims priority, application Japan, Feb. 12, 1987, 62-19110

Int. Cl.[4] H02K *21/16, 16/04*

U.S. Cl. 310—113 **2 Claims**



1. A unitary engine starting motor and charging generator device including a plurality of revolving-field poles (**102***a*, **102***b*) mounted on a crankshaft (**8**) of an engine and serving as a carrier for a clutch (**16**) operably coupled between said crankshaft and a transmission drive shaft (**17**), field coils (**103**) for exciting said revolving-field poles, an armature core (**104**) secured on an engine body (**13**), and an armature coil (**105**) wound thereabout, characterized in that a first annular recess (**25**) is formed in the axial direction in an end of said revolving-field poles on a clutch side thereof, a clutch disc (**18**) which contacts said revolving-field poles, a pressure plate (**19**) which presses said clutch disc toward the revolving-field poles, and a disc-shaped clutch spring (**20**) are disposed fully within said recess to attendantly reduce the overall axial length of the device, a second annular, axial recess is formed in an opposite end of said revolving field poles on a crankshaft side thereof, and an elongate crank angle detector (**106**) is disposed within said second recess in a radial orientation to further reduce the axial length of the device, and wherein said motor and generator are commutatorless.

4,894,571

APPARATUS FOR MAKING ELECTRICAL CONNECTIONS IN A DYNAMOELECTRIC MACHINE

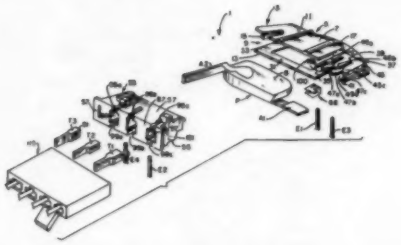
Eugene F. Hildebrandt, and Thomas V. Ottersbach, both of St. Louis, Mo., assignors to Emerson Electric Co., St. Louis, Mo.

Filed Oct. 7, 1988, Ser. No. 255,727

Int. Cl.[4] H02K *11/00*

U.S. Cl. 310—68 C **28 Claims**

1. In a dynamoelectric machine having a stator assembly comprised of one or more sets of electrical windings, each end of each set of windings being adapted for connection to external electrical leads by which an electric current is applied to the windings, a plurality of electrical terminals for making the connection between the external leads and the sets of windings, and protector means connected between at least one external lead and at least one set of windings for sensing an operating condition of the stator assembly and interrupting flow of current to the sets of windings when a sensed condition exceeds a predetermined level, the improvement comprising apparatus for electrically interconnecting the external electrical leads, protector means and ends of said at least one of windings, said apparatus including a first means for commonly connecting



one end of said winding set with the protector means and for housing the protector means, and a second means interlocking with the first means to hold the protector means in place, said second means including means for effecting connection of the protector means to one of the external leads and for connecting the other end of said at least one winding set to another of the external leads.

4,894,572

DISK-TYPE BRUSHLESS FAN MOTOR

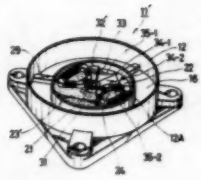
Manabu Shiraki, Yamato, Japan, assignor to Shicoh Engineering Co., Ltd., Kanagawa, Japan

Filed Oct. 30, 1986, Ser. No. 924,903

Claims priority, application Japan, Feb. 19, 1986, 61-23420[U]

Int. Cl.[4] H02K *11/00*

U.S. Cl. 310—68 B **9 Claims**



1. A single-phase disk-type brushless fan motor, comprising:

a rotatably mounted magnet rotor having 2P alternate north and south poles, P being an integer equal to or greater than 1;

a stator yoke provided in an opposing relationship to said magnet rotor with an axial air gap left therebetween;

at least one coreless armature coil provided at a same-phase position on said stator yoke;

at least one cutaway portion formed in said stator yoke at a position for allowing self-starting of said brushless fan motor;

a printed circuit board provided on a lower face of said stator yoke;

an energization controlling circuit provided on a lower face of said printed circuit board for detecting a magnetic pole of said magnet rotor to switchably energize said coreless armature coil;

a position-detecting element for detecting a magnetic pole of said magnet rotor said position-detecting element being provided on an upper face of said printed circuit board at a region opposing said magnet rotor through said cutaway portion of said stator yoke; and

cutaway means formed in said printed circuit board at said region for allowing opposite leads of said coreless armature coil to extend therethrough, so that said opposite leads of said coreless armature coil are guided through said cutaway portion of said stator yoke and through said cutaway means to said lower face of said printed circuit board and are connected electrically to said energization controlling circuit.

4,894,573

ROTARY ELECTRICAL MACHINES

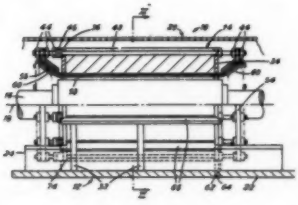
John Simpson, Whitley Bay, England, assignor to Northern Engineering Industries PLC, Newcastle Upon Tyne, England

Filed Dec. 8, 1988, Ser. No. 281,831

Claims priority, application United Kingdom, Dec. 11, 1987, 8729045; Aug. 30, 1988, 8820485

Int. Cl.[4] H02K *5/04, 15/02*

U.S. Cl. 310—217 **15 Claims**



1. A rotary electrical machine having a stator, the stator comprising an annular core and a rotor extending through the core and mounted for rotation about a horizontal axis, the annular core comprising a series of laminations and respective end plates at opposite ends of the core, the laminations being held under compression between said end plates, the machine being further provided with an open-topped structure for assembly of the core, the core having downwardly directed faces on opposite sides of a vertical plane through the axis of rotation, said structure comprising supports that engage said downwardly directed faces, whereby the core laminations can be assembled on the structure by lowering them onto said supports with the structure horizontal.

4,894,574

STATOR SUPPORT FOR ELECTRIC MACHINE

Istvan Ragaly, Schwieberdingen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

PCT No. PCT/DE86/00326, § 371 Date Jul. 1, 1987, § 102(e) Date Jul. 1, 1987, PCT Pub. No. WO87/03147, PCT Pub. Date May 21, 1987

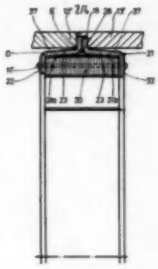
PCT Filed Aug. 13, 1986, Ser. No. 86,699

Claims priority, application Fed. Rep. of Germany, Nov. 6, 1985, 3539298

Int. Cl.[4] H02K *1/12*

U.S. Cl. 310—258 **22 Claims**

1. A device for supporting a stator of an electric machine, wherein the stator has a stator yoke with an axis and an outer annular surface and the electric machine has a housing with housing parts which have at least one borehole, the device comprising an intermediate ring which is arranged radially outwardly of the outer annular surface of the stator yoke between the stator yoke and the housing parts at a predetermined radial distance from the latter, said ring including two half-shell-shaped ring portions arranged to embrace the stator yoke at both axial sides and each including a lateral annular flange, an axially extending half-ring surface, and a vertical flange; means for clamping said intermediate ring between the housing parts of the housing, said vertical flanges of said half-shell-shaped ring portions abutting against one another and being clamped in the borehole so as to form said clamping



means; and means connecting said intermediate ring with the stator yoke.

4,894,575

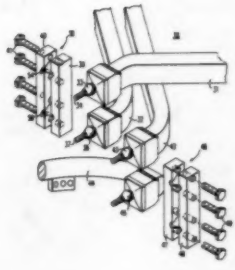
BOLTED SPHERICAL SERIES/PHASE GENERATOR CONNECTIONS

Lennart S. Nilsson, Winter Springs; John M. Butler, III, Orlando; Hector O. Ponce, Pensacola, and Darrell R. Morrison, Orlando, all of Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 7, 1988, Ser. No. 268,103

Int. Cl.[4] H02K *3/46, 3/50;* **H01R** *4/28*

U.S. Cl. 310—260 **4 Claims**



3. In an electrical generator having stator coil sections, connectors connecting pairs of said coil sections at their ends, said ends having a spacing therebetween and respective axes of projection, and means for mechanically connecting at least one of said connectors to the end of each coil section of its pair, the improvement wherein at least one of said connectors comprises a solid bar of a conductive material, said bar having two detents of a spacing equal to said coil end spacing, said detents having an axis corresponding to said axis of projection, said coil ends each having a header cap terminating in a spherical portion, each of said detents tightly receiving said predetermined geometry portion of one of said header caps.

4,894,576

SURFACE-ACOUSTIC-WAVE CONVOLVER

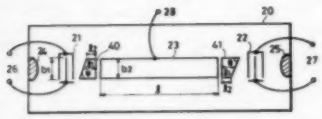
Takeshi Okamoto, and Syuichi Mitsutsuka, both of Tokyo, Japan, assignors to Clarion Co., Ltd., Tokyo, Japan

Filed Apr. 1, 1988, Ser. No. 177,507

Claims priority, application Japan, Apr. 10, 1987, 62-088548; Apr. 10, 1987, 62-088549

Int. Cl.[4] H01L *41/08*

U.S. Cl. 310—313 D **16 Claims**



1. A surface-acoustic-wave convolver comprising:
a pair of input electrodes;
an output electrode for obtaining convolution signals of input signals applied to respective said input electrodes; and
refraction means provided between said input electrodes to refract surface acoustic waves travelling from respective said input electrodes;
wherein said refraction means is provided between each said input electrode and said output electrode; and
wherein said refraction means includes a pair of trapezoid electrodes which are symmetrical about a center point of said output electrode.

4,894,577

PIEZOELECTRIC VIBRATOR WHEREIN THE RELATIVE VIBRATION LEVEL OF UNNECESSARY VIBRATIONS IS DAMPED, AND METHOD OF DAMPING THE RELATIVE VIBRATION LEVEL OF UNNECESSARY VIBRATIONS OF THE PIEZOELECTRIC VIBRATOR

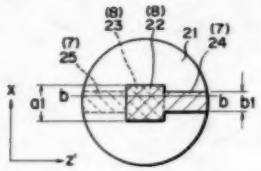
Yukihiro Okamoto, Hanno; Hitoshi Sekimoto, Yokohama, and Toshiki Suganuma, Tokorozawa, all of Japan, assignors to Nihon Dempa Kogyo Co., Ltd., Tokyo, Japan

Filed May 12, 1988, Ser. No. 193,374

Claims priority, application Japan, May 16, 1987, 62-119249; Jun. 10, 1987, 62-144775; Mar. 17, 1988, 63-64115

Int. Cl.[4] H01L *41/08*

U.S. Cl. 310—320 **13 Claims**



1. A piezoelectric vibrator comprising:
a piezoelectric member having two major surfaces;
at least one pair of exciting electrodes formed opposite to each other on the major surfaces of the piezoelectric member, said exciting electrodes and that portion of the piezoelectric member which is held at least between the exciting electrodes, forming a resonance region where thickness-shear vibrations of plural modes are excited;
at least one waveguide path having a cut-off frequency higher than the frequency of a thickness-shear vibration of at least one desired vibration mode excited in the resonance region but lower than the frequency of at least one thickness-shear vibrations excited in the resonance region, said waveguide path extending in substantially the same direction as the propagating direction of said thickness-shear vibration whose damping is desired, and said waveguide path having a width which is substantially equal to or greater than the corresponding width of said resonance region; and
a vibration absorbent arranged in the waveguide path.

4,894,578

ULTRASONIC DRIVING DEVICE

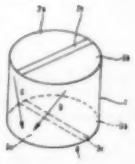
Keisuke Honda, Aichi, Japan, assignor to Honda Electronic Co., Ltd., Aichi, Japan

Filed Jul. 20, 1988, Ser. No. 221,719

Claims priority, application Japan, Jul. 26, 1987, 62-187341

Int. Cl.[4] H01L *41/08*

U.S. Cl. 310—323 **6 Claims**



1. An ultrasonic driving device comprising:
a stator including a columnar piezoelectric vibrator and at least two divided electrodes at end portions of the piezoelectric vibrator,
a member to be driven on one end portion or side portion of the stator, and
means for supplying an alternating current voltage having a resonant frequency for producing vibration in a thickness direction of the piezoelectric vibrator, to at least two of said electrodes.

4,894,579

APPARATUS FOR EFFECTING FINE MOVEMENT BY IMPACT FORCE PRODUCED BY PIEZOELECTRIC OR ELECTROSTRICTIVE ELEMENT

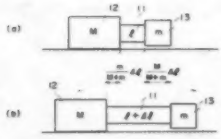
Toshiro Higuchi, Yokohama, and Masahiro Watanabe, Tokyo, both of Japan, assignors to Research Development Corporation of Japan, Tokyo, Japan

Filed May 23, 1988, Ser. No. 197,254

Claims priority, application Japan, May 29, 1987, 62-131304

Int. Cl.[4] H01L *41/08*

U.S. Cl. 310—328 **8 Claims**



1. An apparatus for effecting a fine movement, comprising:
(a) a moving member;
(b) a piezoelectric/electrostrictive element means attached to said moving member for generating moving force;
(c) means for driving said piezoelectric/electrostrictive element; and

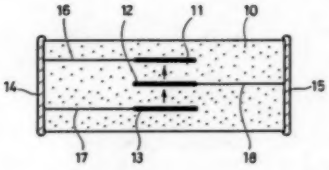
(d) an inertia member means attached to said piezoelectric-/electrostrictive means for imparting inertial energy to said moving member.

4,894,580

CHIP-TYPE RESONATOR AND METHOD OF MANUFACTURING THE SAME

Toshio Ogawa, Kyoto, Japan, assignor to Murata Manufacturing Co., Ltd., Japan

Filed Jul. 7, 1988, Ser. No. 216,036
Claims priority, application Japan, Jul. 7, 1987, 62-170330
Int. Cl.[4] H01L *41/08*
U.S. Cl. 310—320 **7 Claims**



1. A chip-type resonator comprising:
a piezoelectric member;
a plurality of inner electrodes embedded in the interior of said piezoelectric member parallel to one another and spaced apart at inervals along the direction of thickness of the member, said inner electrodes being provided in an odd number of at least three; and
a pair of outer electrodes provided on opposite side surfaces of said piezoelectric member and connected with said inner electrodes, said inner electrodes being alternately connected to said outer electrodes, by leads extending alternately in opposite directions;
said portions of said piezoelectric member between said one pair and each said adjacent pair of inner electrodes being polarized in the same direction, so that when any one portion thereof located between one pair of the inner electrodes expands, each adjacent portion between each adjacent pair of the inner electrodes simultaneously contracts upon application of voltage between said outer electrodes, and said simultaneous expansion and contraction of said portions cancel each other, so that the chip-type resonator remains outwardly in a non-vibrating state as a whole and said expansion and contraction do not substantially cause vibration of the exterior of the chip-type resonator.

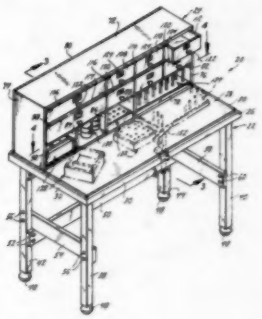
4,894,581

TABLE AND CABINET COMBINATION FOR FLY TYING

George D. Roberts, 241 Dobbin Rd., St. Louis, Mo. 63119

Filed Oct. 26, 1988, Ser. No. 262,748
Int. Cl.[4] A47B *95/00*
U.S. Cl. 312—305 **20 Claims**

1. A table and cabinet combination for storing fly tying supplies and for use in tying fish lures comprising:
a table top having a work surface,
a plurality of legs for supporting the table top with the work surface facing upwardly,
a cabinet supported by the work surface,
a spool holder having a base and a plurality of dowels projecting upwardly from the base and adapted to receive spools on them,
means in the cabinet defining a spool holder compartment having a top, side and bottom walls defining a height and width and adapted for slidable reception of the spool holder within the spool holder compartment whereby when the spool holder is slid into the spool holder compartment the top wall prevents removal of spools from the dowels and when the spool holder is slid from the spool holder compartment spools can be installed on and removed from the dowels,
a tool holder comprising a flat tray having a plurality of recesses of various sizes in it for receiving various tools and implements for fly tying,
means in the cabinet defining a tool holder compartment having top, side and bottom walls defining a height and width adapted for receiving the tool holder with tools



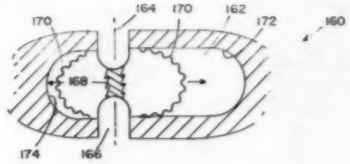
supported in the recesses and projecting upwardly from the tray,
means in the cabinet defining a lazy Susan compartment having top, side and bottom walls,
A lazy Susan comprising a disk rotateably supported from the top wall of the lazy Susan compartment, a plurality of container lids supported from the bottom of the disk, and a plurality of clear stackable containers removably support by the lids,
and a plurality of drawers slidably supported by the cabinet.

4,894,582

METHOD AND APPARATUS FOR ENHANCING SPARK CHANNEL RECOVERY BY SPARK-GENERATED UNSTEADY FLOWS

William J. Thayer, III, Kent, Wash., assignor to Spectra-Physics, Inc., San Jose, Calif.

Filed Oct. 12, 1988, Ser. No. 257,377
Int. Cl.[4] H01T *1/08*; H01J *7/24*
U.S. Cl. 313—231.01 **28 Claims**



1. A spark gap switch for transferring electrical energy from a source to a load in a series of sparks, comprising:
a spark channel having two electrodes for supporting the series of sparks therebetween, one electrode being connected to the source and the other electrode being connected to the load; and
a closed spark chamber containing a dielectric fluid and being defined by a wall enclosing the spark channel, the wall being shaped to produce an unsteady flow of the fluid contained within the spark chamber from the spark cham-

ber through the spark channel by resonating the fluid in response to each spark produced between the two electrodes.

4,894,583

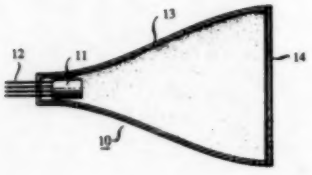
DISPLAY DEVICES WITH YTTRIUM ORTHOSILICATE PHOSPHORS

George W. Berkstresser, Bridgewater; Charles D. Brandle, Jr., Basking Ridge; Joseph Shmulovich, New Providence, and Alejandro J. Valentino, Colonia, all of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Division of Ser. No. 885,229, Jul. 14, 1986, abandoned. This application Sep. 2, 1988, Ser. No. 239,715

Int. Cl.[4] C09K *11/79*

U.S. Cl. 313—468 4 Claims



1. Display device comprising a cathode ray tube, said cathode ray tube comprising:

a. excitation source comprising a beam of electrons;

b. screen comprising phosphor;

c. means for electrical connection to outside source of electrical signal;

d. enclosure attached to the screen;

in which the phosphor comprises yttrium orthosilicate doped with europium and terbium trivalent ions with concentrations of each ion between 0.05 and 25.0 mole percent of the yttrium and in which the output of the europium ions is increased by the presence of terbium ions.

4,894,584

ELECTRIC LAMP PROVIDED WITH A GETTER INCLUDING PALLADIUM

Maarten W. Steinmann, Eersel; Wilhelmus A. A. A. Martens, and Johannes J. G. S. A. Willems, both of Eindhoven, all of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed May 10, 1988, Ser. No. 192,430

Claims priority, application Netherlands, May 13, 1987, 8701136

Int. Cl.[4] H01J *61/26*

U.S. Cl. 313—557 5 Claims

1. An electric lamp provided with

a translucent lamp vessel sealed in a vacuum-tight manner;

a light source arranged within the lamp vessel;

current supply conductors extending from the light source through the wall of the lamp vessel to the exterior;

and a getter within the lamp vessel comprising an intermetallic compound of a first metal with a second metal, characterized in that

the getter contains Pd as a first metal, which metal is chemically bound to at least one second metal selected from the group consisting of Zr and Y, the ratio "mole first metal×100%/(mole first metal plus mole second metal)" lying in the range of 0.4–15%,

and further contains chemically bound oxygen, the ratio "mole O/mole second metal" lying in the range of 0.02–1.0 and the getter having a particle size of mainly ≦40 μm.

4,894,585

COMBINATION LAMP

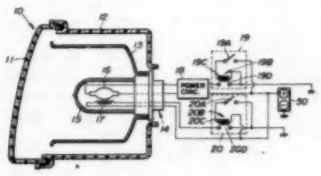
Toru Segoshi, Kanagawa, Japan, assignor to Nissan Motor Company, Limited, Japan

Filed Dec. 23, 1986, Ser. No. 945,679

Claims priority, application Japan, Feb. 25, 1986, 61-38338

Int. Cl.[4] H01J *61/52*

U.S. Cl. 315—112 11 Claims



10. An automotive headlight system comprising:

(a) a high intensity discharge lamp operable for emitting a high intensity beam of light;

(b) an auxiliary incandescent lamp located proximate to, and selectively operable independently of, said high intensity discharge lamp for emitting and radiating light and heat energy; and

(c) a heat reflector for concentrating said heat energy from said auxiliary incandescent lamp onto said high intensity discharge lamp to preheat said high intensity discharge lamp.

4,894,586

CROSSED-FIELD AMPLIFIER BIAS CIRCUIT AND METHOD FOR IMPROVED STARTING

Carl R. Crager; Kenneth F. Ramacher, both of Montoursville, and Frank A. Zawada, Williamsport, all of Pa., assignors to Litton Systems, Inc., Beverly Hills, Calif.

Filed Feb. 18, 1988, Ser. No. 157,644

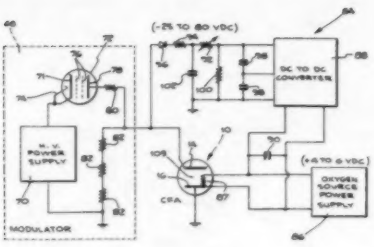
Int. Cl.[4] H01J *25/34*; H03F *3/54*

U.S. Cl. 315—39.51 10 Claims

1. In a crossed-field amplifier having an anode and a cathode creating an electric field across a magnetic field in an interaction area, the improvement comprising:

electric bias circuit means connected to said cathode for

generating a potential from said cathode across said interaction area for causing the presence of electrons in said



interaction area after said amplifier is turned off to provide for a fast start of said amplifier.

4,894,587

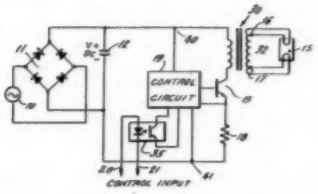
HIGH FREQUENCY GAS DISCHARGE LAMP DIMMING BALLAST

Aaron Jungreis, Allentown; Dennis Capewell, Penllyn, and David G. Luchaco, Macungie, all of Pa., assignors to Lutron Electronics Co., Inc., Coopersburg, Pa.

Continuation-in-part of Ser. No. 642,072, Aug. 17, 1984, Pat. No. 4,663,570. This application May 4, 1987, Ser. No. 45,898

Int. Cl.[4] H05B *37/02*

U.S. Cl. 315—200 R **25 Claims**



1. An electronic ballast for a gas discharge lamp; said electronic ballast being dimmable over a large range; said ballast comprising: an a-c input circuit; a rectifier having a-c terminals connected to said a-c input circuit and having d-c output terminals; a filter capacitor connected across said d-c output terminals; a gas discharge lamp connected in circuit relation with said d-c output terminals and deriving its total energy therefrom; a single semiconductor switching means having a control electrode and first and second power terminals; a current sensing means; a control circuit connected to said control electrode and operable to turn said switching means on and off at a controlled duty cycle rate; a dimming level set circuit connected to said control circuit to set said duty cycle to a value related to a given degree of dimming of said lamp; said current sensing means being connected to said control circuit and operable to adjust said duty cycle to a value which maintains the current through said current sensing means at a value related to that called for by said dimming level set circuit; an energy storage inductor and a coupling capacitor; said d-c output terminals, said energy storage inductor, said single semiconductor switch means and said current sensing means being connected in closed series relation, said coupling capacitor coupling said ballast to said single semiconductor switch means.

4,894,588

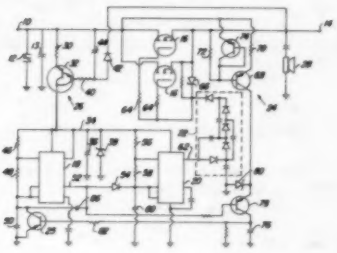
HIGH EFFICIENCY FLASHER

Thomas E. Stack, Troy, Mich., assignor to Vultron, Inc., Auburn Heights, Mich.

Filed Jan. 25, 1988, Ser. No. 148,088

Int. Cl.[4] H05B *37/00*

U.S. Cl. 315—241 P **7 Claims**



1. A high effciency high load flasher for incandescen: lamps comprising;

input terminals for coupling to a DC source and output terminals for coupling to incandescent lamps,

MOSFET switch means between the input and output terminals for switchably controlling output current flow,

gate supply means for supplying gate voltage to the switch means for switch operation,

oscillator means for periodically enabling and disabling the gate supply means to effect periodic output current flow,

protective means responsive to said current flow for preventing damaging current flow to the MOSFET switch means,

and measn for disabling the protective means during current inrush to the incandescent lamps.

4,894,589

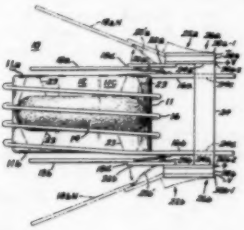
STARTING MEANS, WITH PIEZOELECTRICALLY-LOCATED CAPACITIVE STARTING ELECTRODES, FOR HID LAMPS

Joseph C. Borowiec, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Aug. 8, 1988, Ser. No. 229,187

Int. Cl.[4] H05B *41/24*

U.S. Cl. 315—248 **11 Claims**



1. Means for aiding starting of a plasma arc discharge within an arc tube of an electrodeless high-intensity-discharge (HID) lamp of the type having said arc tube situated within the bore of an excitation coil and within which arc tube said plasma arc discharge is to be formed and driven by the excitation coil, comprising:

a pair of starting electrodes;

means for positioning each of the starting electrodes, at least during commencement of the plasma arc discharge, to a

first location adjacent to the exterior surface of an associated one of a pair of opposed surfaces of the arc tube, responsive to the presence of a stimulus, and for repositioning each starting electrode to a second location different from said first location, with respect to said arc tube, responsive to the absence of said stimulus; and

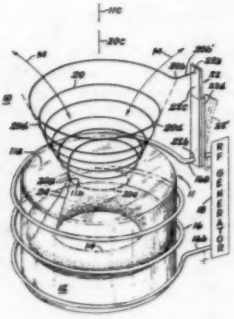
means for coupling an externally-provided high-voltage signal between the pair of starting electrodes to cause creation, at least at said plasma arc discharge commencement, of a glow discharge within the arc tube due to capacitive current flow therethrough from said starting electrodes.

4,894,590

SPIRAL SINGLE STARTING ELECTRODE FOR HID LAMPS

Harald L. Witting, Burnt Hills, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Aug. 1, 1988, Ser. No. 226,584
Int. Cl.[4] H05B *41/24*
U.S. Cl. 315—248 **9 Claims**



1. A starting electrode for an electrodeless high-intensity-discharge (HID) lamp of the type having an arc tube situated within the bore of an excitation coil and within which arc tube a plasma arc discharge is to be formed and driven by the excitation coil, comprising:

a single starting electrode having a spiral shape and positioned, at least during commencement of the plasma arc discharge, with a narrower end adjacent to a selected point on an exterior surface of the arc tube; and

means for positioning the electrode with a wider end at a selected location, to place the electrode within magnetic flux, generated by the excitation coil, sufficient to cause creation, at least at said plasma arc discharge commencement, of a glow discharge within the arc tube.

4,894,591

INVERTED EXCITATION COIL FOR HID LAMPS

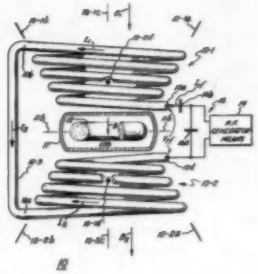
Harald L. Witting, Burnt Hills, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Sep. 6, 1988, Ser. No. 240,331
Int. Cl.[4] H05B *41/24*
U.S. Cl. 315—248 **19 Claims**

1. An excitation coil, adaptable for use with an arc tube in an electrodeless high-intensity-discharge (HID) lamp, comprising:

first and second solenoidal portions of coiled conductor, each with an axis substantially aligned with the axis of the other portion, each wound in a common direction to produce, responsive to a signal current flowing in the same direction through both portions, a magnetic field adding in-phase to the magnetic field of the other portion, and each with a first end located nearest to a central volume in which said arc tube can be positioned and a second end located further from the other portion than the first end; and

another conductive portion connecting the two second ends to one another;



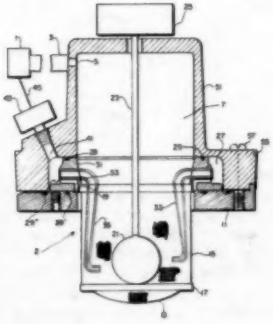
the pair of first ends being adapted to receive a radio-frequency signal of characteristics selected to cause said coil to start and maintain a plasma arc discharge in said arc tube.

4,894,592

ELECTRODELESS LAMP ENERGIZED BY MICROWAVE ENERGY

Robert M. Ervin, Silver Spring, and Joseph Perret, Germantown, both of Md., assignors to Fusion Systems Corporation, Rockville, Md.

Filed May 23, 1988, Ser. No. 197,351
Int. Cl.[4] H05B *37/00*
U.S. Cl. 315—248 **4 Claims**



1. An electrodeless lamp comprising:

(a) a microwave cavity;

(b) a source of microwaves in communication with said cavity;

(c) a lamp envelope containing a plasma-forming medium mounted within said microwave cavity;

(d) a gas manifold for feeding gas to at least one gas passageway for directing a stream of gas to the outer surface of said envelope;

(e) a gas leak passageway leading from said gas manifold;

(f) a conductive mesh assembly for retaining microwaves within said cavity and permitting light to be emitted from said cavity, said assembly including gas flow blocking means for preventing the flow of gas through said gas leak passageway when said screen is in place in the lamp; and,

(g) means for shutting off said source of microwaves when the gas pressure in said manifold drops below a predetermined value.

4,894,593

METHOD OF CORRECTING ELECTRON BEAM MISCONVERGENCE IN A COLOR DISPLAY TUBE AND A COLOR DISPLAY TUBE SYSTEM

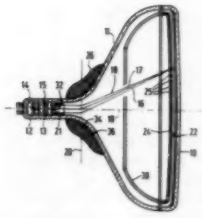
Piet G. J. Barten, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 7, 1987, Ser. No. 47,752

Claims priority, application United Kingdom, May 9, 1986, 8611321

Int. Cl.[4] H01J *29/70, 29/76*

U.S. Cl. 315—368 **16 Claims**



1. A method of correcting electron beam misconvergence in a colour display tube comprising: an envelope consisting of an optically transparent faceplate, a conical portion and a neck, and within the envelope an electron gun system in the neck and a cathodoluminescent screen on the inside of the faceplate; electron beam deflection means being arranged on the neck-cone transition of the envelope; the method comprising: providing at least one magnetisable substantially annular element externally of the envelope at, or on the screen side of, the plane of deflection of the deflection means; measuring the convergence of the electron beams at the screen with the deflection means in place; and magnetising the annular element as a multipole, the number of poles and their respective strengths being such as to correct for the measured dynamic convergence errors.

4,894,594

SERVO SYSTEM SPEED CONTROL APPARATUS

Hideaki Kawamura, Hachioji; Kentaro Fujibayashi, Mitaka, and Nozomu Arimoto, Hino, all of Japan, assignors to Fanuc Ltd, Yamanashi, Japan

PCT No. PCT/JP88/00049, § 371 Date Sep. 21, 1988, § 102(e) Date Sep. 21, 1988, PCT Pub. No. WO88/05566, PCT Pub. Date Jul. 28, 1988

PCT Filed Jan. 23, 1988, Ser. No. 255,192

Claims priority, application Japan, Jan. 24, 1987, 62-013328

Int. Cl.[4] G05B *19/10*

U.S. Cl. 318—567 **5 Claims**

1. A servo system speed control apparatus for controlling speed of a servo system by using a computer, said servo system speed control apparatus comprising:

a block speed pre-read means for reading beforehand a speed value designated for a plurality of blocks;

a deceleration start position calculating means for calculating; at a start position of said blocks read beforehand, a deceleration start position to maintain said servo system at a speed below said designated speeds for said blocks; and a servo system deceleration means for lowering said speed of said servo system from said calculated deceleration start

N 100	G 05.1		
N 110	G 00	G 80	X 0
N 120	G 01	G 91	F 1000
N 130	X 50.		
N 140	X 50.		
N 150	X 50.		
N 160	X 50.		
N 170	G 01	X 50.	F 100
N 180	X 50.	F 500.	
N 190	X 10.	F 100.	
N 200	X 100.	F 500.	
N 210	G 05.1	P 1	

position to thereby control deceleration of said servo system with a high degree of accuracy.

4,894,595

INDUSTRIAL ROBOT

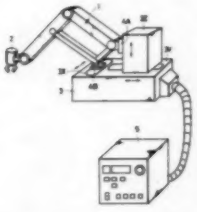
Kenji Sogawa; Makoto Doi, and Mikio Hasegawa, all of Osaka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Apr. 6, 1988, Ser. No. 178,165

Claims priority, application Japan, Apr. 8, 1987, 62-86045

Int. Cl.[4] G05B *19/42*

U.S. Cl. 318—568.24 **12 Claims**



1. An industrial robot comprising:

(a) a movable arm;

(b) an electric motor dirving the arm;

(c) means for controlling a current flowing through the motor, and moving the arm into predetermined positions and balancing the arm in the predetermined positions sequentially;

(d) means for memorizing values of the motor current at which the arm is balanced in the respective predetermined positions;

(e) means for calculating a target value of the motor current on the basis of the memorized motor current values, the target motor current value allowing the arm to be balanced in a given position.

4,894,596

VELOCITY CONTROL APPARATUS

Ryuichi Hara, Yamanashi, Japan, assignor to Fanuc Ltd., Minamitsuru, Japan

PCT No. PCT/JP88/00420, § 371 Date Oct. 31, 1988, § 102(e) Date Oct. 31, 1988, PCT Pub. No. WO88/08562, PCT Pub. Date Nov. 3, 1988

PCT Filed Apr. 27, 1988, Ser. No. 265,676

Claims priority, application Japan, Apr. 30, 1987, 62-107262

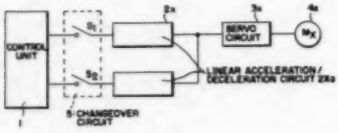
Int. Cl.[4] G05B *11/18*

U.S. Cl. 318—568.1 **2 Claims**

1. A velocity control apparatus having drive mechanisms for a plurality of axes for controlling movement of a movable

member along a set trajectory at a predetermined velocity, comprising:

velocity override means for changing and setting a commanded velocity of the movable member at a predetermined rate based on a velocity commanded for each direction of movement; and



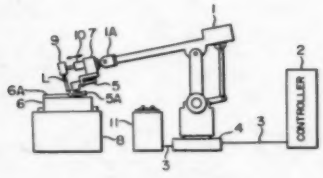
acceleration/deceleration means, having a time constant capable of being changed in inverse proportion to a velocity set by said velocity override means, for driving the movable member.

4,894,597

DEBURRING ROBOT

Sadayuki Ohtomi, Inazawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed May 18, 1988, Ser. No. 195,292
Claims priority, application Japan, May 21, 1987, 62-124361
Int. Cl.[4] G05B *19/42*
U.S. Cl. 318—568.22 **7 Claims**



1. A deburring robot, operated by a controller storing predetrmined taught position data, for removing burrs remaining on a workpiece, comprising:

an arm-like member movably mounted on a pedestal;

a grinder mounted onto said arm-like member and having a grinding wheel for removing the burrs remaining on the workpiece;

a detecting means mounted on said arm-like member in the vicinity of said grinder for detecting the position of the workpiece and the positions and shapes of the burrs remaining thereon; and

a positioning means for positioning said grinder in accordance with said detecting means by correcting the predetermined taught position data.

4,894,598

DIGITAL ROBOT CONTROL HAVING AN IMPROVED PULSE WIDTH MODULATOR

Kenneth E. Daggett, Murrysville, Pa., assignor to Staubli International AG, Switzerland

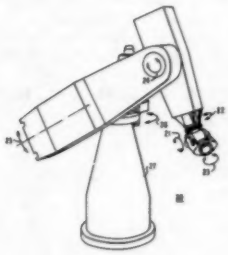
Continuation of Ser. No. 932,841, Nov. 20, 1986, abandoned. This application Aug. 5, 1988, Ser. No. 231,627
Int. Cl.[4] G05B *19/42*
U.S. Cl. 318—568.16 **24 Claims**

1. A digital pulse width modulator circuit for operating power amplifiers and joint motors during positive, negative and non-forcing motor drive requests by measuring the motor current in an associated sense resistor for each joint motor in a robot control comprising:

up/down counter means for generating a sawtooth waveform, having positive and negative apexes adapted for timing the current measurement within a control pulse interval, by counting up to and down from an upper endpoint to a lower endpoint as a function of time;

means for comparing the count of the counter means for the sawtooth waveform to a signal representing a control command so as to define a time span needed to operate a power amplifier and energize an associated joint drive motor in accordance with the control command;

means for generating a first output control pulse for power



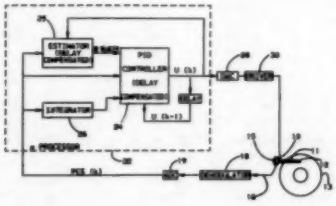
amplifier switching when one drive polarity is commanded, said first output control pulse having a width corresponding to the defined time span and based on a count comparison referenced to the upper endpoint of the sawtooth waveform; and means for generating a second output control pulse for power amplifier switching when the other polarity is commanded, said second output control pulse having a width corresponding to the defined time span and based on a count comparison referenced to the lower endpoint of the sawtooth waveform.

4,894,599

DEADBEAT CONTROL OF DISK DRIVE ACTUATOR

Hjalmar H. Ottesen, Rochester, Minn.; Yuzo Nakagawa, Hiratsuka, and Shyunji Ono, Fujisawa, both of Japan, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 31, 1988, Ser. No. 175,699
Int. Cl.[4] G05B *21/02*
U.S. Cl. 318—636 **8 Claims**



1. A rotating data storage device having transducer means mounted on an actuator for movement from track to track comprising

motor means connected to said actuator for effecting track to track movement of said transducer means; and

servo control means for causing said motor means to position said actuator, said servo control means including seek control means for moving said transducer means from an initial position to a position within a predetermined distance of the target track centerline and settle mode control means for controlling transducer positioning from said predetermined distance to alignment with said target track centerline,

said settle mode control means comprising a deadbeat control sequence of a predetermined number of servo data samples to position said transducer means at said target track with no steady-state error and no ripple between settle mode servo samples.

4,894,600

ADAPTIVE WORK STATION

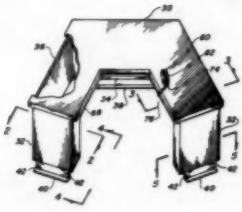
Deborah A. Kearney, 165 Front St., Chicopee, Mass. 01013

PCT No. PCT/US88/01205, § 371 Date Aug. 24, 1988, § 102(e) Date Aug. 24, 1988

PCT Filed Apr. 18, 1988, Ser. No. 261,012

Int. Cl.[4] B64C *17/06*

U.S. Cl. 318—649 **15 Claims**



1. A work station adapted for facilitating physically challenged and developmentally disabled personnel comprising:

(a) a work table top in a truncated "U" shape having a center, angular sides, and ends on the outside periphery, formed of a flat, relatively hard material suitable for working thereupon, further having the structural integrity to support objects placed thereupon,

(b) a pair of end vertical panels extending downward from the ends of the table top to support the top at a convenient height from a floor,

(c) a vertical panel extending downward from the rear of the table top furnishing structure to support the table top and form an enclosing surface,

(d) a pair of side skirts extending downward from the angular sides of the table top contiguously abutting the end vertical panels and the rear vertical panel forming a protective vertical enclosure and weight bearing member, and

(e) height-adjusting means allowing the distance from a floor to the top of the table top to be altered such that different size wheelchairs may be accommodated under the table top.

4,894,601

TESTING AND BATTERY EXERCISING METHOD AND CONTROL FOR AN EMERGENCY LIGHTING UNIT

Harley (Jim) E. Watkins, 14425 Garden Rd., Golden, Colo. 80401

Filed Jun. 16, 1988, Ser. No. 207,737

Int. Cl.[4] G01J *5/18*; G08B *13/18*; F21V *33/00*; H02J *7/00*

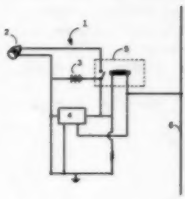
U.S. Cl. 320—14 **19 Claims**

1. A method of testing and exercising an emergency lighting unit, the unit electrically connected to a primary power source and including illuminating means powered by a rechargeable power source, means for recharging the rechargeable power source from a primary power line and switching means responsive to a reduction of voltage in the primary power line to switch on the illuminating means to illuminate a pre-selected illumination area comprising the steps of:

sensing a heat pattern over the pre-selected illumination area and determining when a change in said heat pattern occurs;

sensing ambient light in the pre-selected area and determining when the ambient light in the preselected area is less that or equal to a preselected threshold; and

simulating a reduction in voltage of the power line in such a manner as to activate the switching means in response to



a change in the heat pattern only when the ambient light is less than or equal to the preselected threshold whereby an inspector may observe the function of the unit by entering the illumination area when it is in darkness.

4,894,602

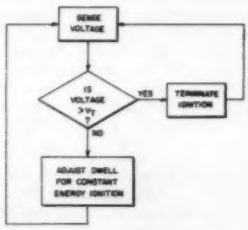
OVERVOLTAGE PROTECTION SYSTEM FOR MARINE IGNITION AND REGULATOR CIRCUITRY

James A. Davis, Ripon, and William B. Mayer, Oshkosh, both of Wis., assignors to Brunswick Corporation, Skokie, Ill.

Filed Jun. 2, 1988, Ser. No. 201,545

Int. Cl.[4] H02P *9/04*; F02P *9/00*

U.S. Cl. 322—38 **1 Claim**



1. A marine propulsion system comprising an internal combustion engine driving a voltage generator supplying system voltage to ignition circuitry providing spark ignition for running said engine in normal operation, said ignition circuitry including voltage sensing circuitry sensing said system voltage and adjusting ignition dwell in accordance therewith to maintain substantially constant energy for said spark ignition in said normal operation, a marine battery charged by said system voltage, a voltage regulator sensing and regulating said system voltage, said voltage sensing circuitry of said ignition circuitry sensing said system voltage and responding to system voltage below a given threshold to continue said normal operation and said substantially constant energy for said spark ignition, said voltage sensing circuitry of said ignition circuitry responding to system voltage above said given threshold to reduce engine speed, to reduce said system voltage, wherein said given threshold is below a given overvoltage for protection of said ignition circuitry and is also below a given overvoltage for protection of said voltage regulator, and wherein the same said voltage sensing circuitry of said ignition circuitry provides all three of said functions of (a) sensing system voltage for adjusting ignition dwell to maintain substantially constant energy for said spark ignition, (b) sensing system voltage for protection of said ignition circuit against overvoltage, and (c) sensing system voltage for protection of said regulator against overvoltage.

4,894,603

METHOD AND APPARATUS FOR ANALYSIS OF GAS BY MEANS OF ABSORPTION FREQUENCY REGULATION

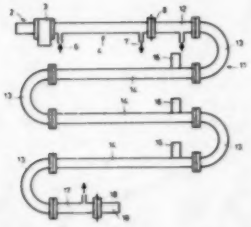
Lutz Berger, Eggenstein; Heimo Breton, Oberuldingen; Helmut Giraud, Stutensee; Gunther Krieg, Karlsruhe; Horst Günther, Eggenstein-Leopoldshafen, and Gerhard Schmitt, Karlsruhe, all of Fed. Rep. of Germany, assignors to Kernforschungszentrum Karlsruhe GmbH, Karlsruhe, Fed. Rep. of Germany

Filed Jul. 9, 1987, Ser. No. 71,657

Claims priority, application Fed. Rep. of Germany, Jul. 9, 1986, 3622957

Int. Cl.[4] G01N *22/00*

U.S. Cl. 324—639 24 Claims



1. A method for analyzing a gaseous medium with respect to a component having a characteristic absorption frequency spectral line, comprising: generating microwave radiation at a selected frequency; generating a first Stark voltage selected to have a value such that a reference signal produced by subjecting the component to the microwave radiation and the first Stark voltage has a zero passage, resulting from the change in polarity between the spectral line and the Stark voltage lines, at a frequency coinciding with the characteristic absorption frequency spectral line; and regulating the microwave radiation frequency as a function of frequency shifts of the zero passage of the reference signal.

4,894,604

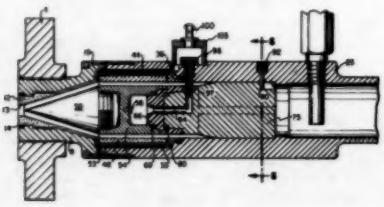
FLUID CAPACITANCE SENSING MEANS AND METHOD

Donald J. Dowling, and Jackie C. Sims, both of Houston, Tex., assignors to Texaco Inc., White Plains, N.Y.

Filed Nov. 3, 1988, Ser. No. 269,341

Int. Cl.[4] G01R *27/26*

U.S. Cl. 324—690 7 Claims



1. A capactive fluid sensor comprising:

means receiving a stream of fluid for converting the fluid flow to annular fluid flow; and

capactive sensing means for providing a capacitance signal related to the dielectric constant of the annular flowing fluid, said capacitive sensing means includes:

a cylindrical electrode,

electrode means, cylindrical in shape, spatially arranged with the electrode so that the fluid flows between both the electrode and the electrode means for providing an internal capacitance for the capacitive sensing means substantially greater than a capacitance derived from the dielectric constant of the fluid, and

output means connected to the electrode and to the electrode means for providing the capacitance signal.

4,894,605

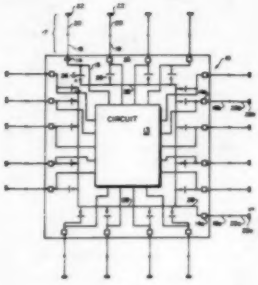
METHOD AND ON-CHIP APPARATUS FOR CONTINUITY TESTING

Diethelm Ringleb, Andover; Reinhard Schumann, Stow; Elsworth Stearns, Hudson; Tom Stylianos, Jr., Acton, all of Mass., and John Sweeney, Derry, N.H., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed Feb. 24, 1988, Ser. No. 159,757

Int. Cl.[4] G01R *27/02, 31/28*

U.S. Cl. 324—537 12 Claims



1. A continuity test circuit for an integrated semi-conductor component comprising circuit components fabricated on a section of semi-conductor material, the semi-conductor component having a plurality of contact pads to which external conductive leads are bonded, and a like plurality of contact pad conductors, each extending between a separate contact pad and the individual circuit components, the continuity test circuit comprising:

A. a common conductor fabricated on the integrated semi-conductor component, said common conductor connected to a test contact pad on the semi-conductor component to which external test leads are bonded thereto; and

B. a plurality of current gate means fabricated on the integrated semi-conductor component each of said gate means having at least a first terminal and a second terminal, each first terminal of said gate current means connected to a separate contact pad conductor, each second terminal of said current gate means connected to said common conductor; each of said current gate means controlling current flow so that when a test signal is applied to only the associated first terminal or only the associated second terminal, a measurable response signal will appear at the terminal the test signal is not applied to.

4,894,606

SYSTEM FOR MEASURING MISREGISTRATION OF PRINTED CIRCUIT BOARD LAYERS

Tom R. Paur, 400 East Lake Samm Road S.E., Redmond, Wash. 98053

Filed Jul. 7, 1988, Ser. No. 216,080

Int. Cl.[4] G01R *31/02*

U.S. Cl. 324—65 R 4 Claims

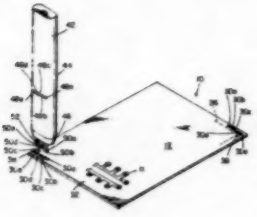
1. A system for measuring the amount of misregistration of printed circuit board layers, comprising:

a printed circuit board with a plurality of layers fabricated in face-to-face juxtaposition, each having electrically conductive traces which require interconnection between

said layers, said layers including an exterior layer and a plurality of inner layers inwardly located relative to said exterior layer, said layers being positioned in registration with each other within a predetermined maximum tolerance range;

a plurality of electrically conductive planes, each having a plurality of apertures therethrough and a common contact portion, said apertures and common contact portion for each said plane having a substantially identical placement pattern on said plane, each said plane being attached to one of said inner layers at a substantially identical location and orientation on said inner layer as the others of said planes are attached to the others of said inner layers, attachment being made prior to the assembly of said inner layers together to fabricate the circuit board, whereby said apertures of each one of said planes are in general alignment within said maximum tolerance range with correspondingly positioned ones of said apertures of the others of said planes, subject to deviation from perfect alignment as a result of said inner layers being positioned out of registration with said exterior layer during fabrication of the circuit board;

a plurality of electrically conductive through-hole conductors formed in said layers after fabricated in face-to-face juxtaposition, said conductors being located relative to said exterior layer to position each said conductor to extend through said layers and within correspondingly positioned ones of said apertures of each said plane attached to said inner layers, said conductors



each having a conductor contact portion at said exposed exterior surface of said exterior layer, each of said conductors and the correspondingly positioned ones of said apertures through which extending having relative sizes to produce a clearance therebetween if said inner layer is in perfect registration with said exterior layer, with said clearance for each of said conductors being of a predetermined and incrementally increasing size, said conductors being out of electrical contact with any of said planes if each said inner layer is in perfect registration with said exterior layer, and one or more of said conductors being in electrical contact with at least one of said planes if said inner layer to which attached is out of registration with said exterior layer by an amount at least as great as the smallest of said clearances, the incrementally increasing clearances for any of said conductors in electrical contact with one of said planes indicating the amount of misregistration of at least one of said inner layers with said exterior layer;

an electrically conductive, common through-hole conductor formed in said layers and being located relative to said exterior layer to position said common conductor to extend through each of said common contact portions of said planes in electrical contact therewith, said common conductor having a monnon conductor contact portion at said exposed exterior surface of said exterior layer, when any one of said inner layers is out of registration with said exterior layer by a sufficiently large amount within said maximum tolerance range, one or more electrically conductive paths are established between the corresponding ones of said conductors, said plane of said inner layer out of registration and said common conductor, and the greater any one of said inner layers is out of registration with said exterior layer, the more of said conductors with the greater of said clearances with respect to the correspondingly positioned ones of said apertures are in electrical contact with said plane of said inner layer which is out of registration, with the particular ones of said conductors in electrical contact with said plane indicating the amount of misregistration of said inner layer within said maximum tolerance range; and

a tester having a plurality of electrically conductive probes with a probe placement pattern corresponding to the placement pattern on said exterior surface of said exterior layer of said conductor contact portion of said conductors and said common conductor contact portion of said common conductor, each of said probes being movable into electrical contact with a correspondingly positioned one of said conductor contact portions of said common conductor contact portion, said tester including means electrically connected to said probes for determining if a conductive path exists between any one of said conductor contact portions and said common conductor contact portion and for indicating the ones of said conductor contact portions for which a conductive path is determined to exist, whereby the amount of layer misregistration is quantitatively indicated.

4,894,607

SURFACE POTENTIAL DETECTING APPARATUS

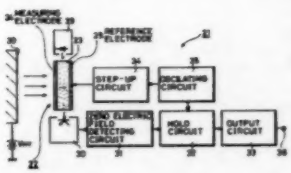
Akira Kumada, Kyoto, Japan, assignor to Murata Manufacturing Co., Ltd., Japan

Filed Oct. 6, 1988, Ser. No. 254,457

Claims priority, application Japan, Oct. 6, 1987, 62-251852

Int. Cl.[4] G01R *23/16*; G02F *1/03*

U.S. Cl. 324—96 **13 Claims**



1. A surface potential detecting apparatus comprising:

an electro-optical crystal element having a measuring electrode thereon to which an electric field from a surface to be measured is directly or indirectly applied, and a reference electrode thereon for receiving a reference potential, to establish a potential difference between itself and said measuring electrode;

alternating voltage means for supplying said reference potential as an alternating voltage of a prescribed frequency to said reference electrode;

detecting means for detecting the electric field strength formed between said measuring electrode and said reference electrode as by measuring an intensity of light transmitted through said crystal element; and

means for deriving the electric field strength of the surface to be measured based on the detected intensity of the transmitted light.

4,894,608

ELECTRIC CURRENT SENSOR USING THE FARADAY EFFECT

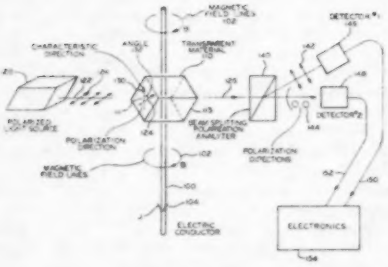
Edward A. Ulmer, Jr., Clearwater, Fla., assignor to Square D Company, Palatine, Ill.

Filed Jul. 22, 1987, Ser. No. 76,456

The portion of the term of this patent subsequent to Jul. 5, 2005, has been disclaimed.

Int. Cl.[4] G01R *31/00*; **G02F** *1/31*

U.S. Cl. 324—96 **29 Claims**



24. An electric current detector, comprising:

a material substantially transparent to light, said material having at least one characteristic direction in the absence of a magnetic field, and said material exhibiting the Faraday effect in response to a magnetic field generated by said electric current;

means for generating said light in a substantially linear polarization in a predetermined polarization direction and for injecting said light having a predetermined polarization direction into said material with an orientation with respect to said at least one characteristic direction such that a predetermined angle of substantially 22.5 degrees is established between said polarization direction and said at least one characteristic direction;

means for separating light emerging from said material into a first component having a first polarization to form a first emerging light beam, and into a second component having a second polarization to form a second emerging light beam;

a first photodetector for detecting an intensity of said first emerging light beam;

means, responsive to said first photodetector, for computing a first ratio of an AC component to a DC component of said intensity of said first emerging light beam;

a second photodetector for detecting an intensity of said second emerging light beam;

means, responsive to said second photodetector, for computing a second ratio of an AC component to a DC component of said intensity of said second emerging light beam;

means for producing a first average value of said first ratio;

means for producing a second average value of said second ratio;

means for computing said quotient by dividing said first average value of said ratio, by said second average value of said second ratio;

means for computing a stress birefringence of said material by using the expression

$$\beta L = 2 * \sin^{-1}(K1 * (R-1)/(R+1))^{\frac{1}{2}}$$

wherein said R is a symbol standing for said quotient and said K1 is a numerical constant to account for polarization leakage in a polarizer;

means, responsive to said birefringence βL, for computing a first correction factor $CF(1,\beta L)$, for said first ratio;

means for correcting said first ratio by said correction factor;

means, responsive to said first ratio and responsive to said first correction factor, for estimating a magnitude, J, of said electric current;

means, responsive to said birefringence βL, for computing a spread function $SF(\beta L)$;

means for adjusting said correction factor using the expression

$$ACF(J,\beta L) = (CF(1,\beta L) - SF(\beta L)) * (J/J_{max})^2$$

means for iterating a calculation of said quantity $ACF(J,\beta L)$ until a new value differs from a last value by less than a predetermined amount; and,

means, responsive to said past value of said quantity $ACF(J,\beta)$, for computing a final value of said electric current.

4,894,609

ELECTRICAL MEASURING DEVICE

Toshisada Fujiki, Kasugai; Taikichi Kondo, Gifu; Yoshinari Furukawa, Tokoname; Kazuaki Kato, Chita; Akimichi Okimoto, and Kenji Tsuge, both of Nagoya, all of Japan, assignors to NGK Insulators, Ltd., Nagoya, Japan

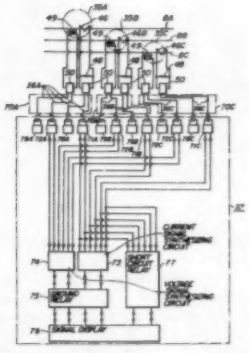
PCT No. PCT/JP86/00402, § 371 Date May 26, 1987, § 102(e) Date May 26, 1987

PCT Filed Aug. 6, 1986, Ser. No. 34,150

Claims priority, application Japan, Aug. 7, 1985, 60-174554; Aug. 7, 1985, 60-174555; Aug. 7, 1985, 60-174556

Int. Cl.[4] G01R *19/00, 31/00, 21/00*

U.S. Cl. 324—107 **6 Claims**



1. An electric measuring device for a three-phase line, comprising:

sensing units having a current transformer and a collector electrode unit, each one of said sensing units being coupled with a respective line conductor of the three-phase line;

first and second optical sensors with electro-optic elements connected to each said current transformer and each said collector electrode unit, respectively;

a resistor connected in parallel to each said current transformer and each one of said first optical sensors;

a measuring unit connected to each sensing unit;

wherein said measuring unit comprises light detectors for current measurement connected to each one of said first sensors, light detectors for voltage measurement connected to each one of said second sensors, light emitters for optical power connected to said light detectors, a current signal synthesizing circuit connected to said light-detectors for current measurement, a voltage signal synthesizing circuit connected to said light-detectors for voltage measurement, a ground relay connected to said current signal synthesizing circuit and said voltage signal

synthesizing circuit, a signal display connected to said ground relay, a short circuit relay connected to said light detectors for current measurement and said signal display, and optical transmission lines made of optical fiber cable serially connected to each one of said first and second optical sensors, said light detectors and said light emitters, respectively.

4,894,610

CURRENT-TRANSFORMER ARRANGEMENT FOR AN ELECTROSTATIC METER

Richard Friedl, Braunschweig, Fed. Rep. of Germany, assignor to LOZ Landis & Gyr Zug AG, Zug, Switzerland

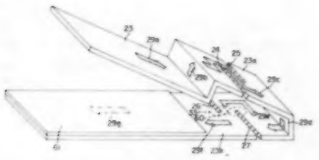
PCT No. PCT/EP86/00515, § 371 Date Jun. 12, 1986, § 102(e) Date Jun. 12, 1987, PCT Pub. No. WO87/01812, PCT Pub. Date Mar. 26, 1987

PCT Filed Sep. 8, 1986, Ser. No. 57,918

Claims priority, application Fed. Rep. of Germany, Sep. 14, 1985, 3532911

Int. Cl.[4] G01R *11/02*

U.S. Cl. 324—127 14 Claims



1. A transformer arrangement for use in a static electricity meter comprising:

a primary conductor for carrying an alternating current to be measured,

a secondary winding comprising at least two identical coils arranged in series and having axes oriented parallel to each other, and

integration means connected to the output of said secondary winding to produce a frequency independent output signal,

wherein said conductor carrying said current to be measured is formed to include at least one loop to generate maximum magnetic field strength,

wherein at least one of the coils of the secondary winding is arranged as closely as possible to said loop for maximum magnetic coupling without the use of any magnetic material and so as to engage as completely as possible the magnetic flux that is generated by the loop,

wherein the coils of the secondary winding extend in their axial direction over an as small as possible partial length of the magnetic field lines generated by said current in said primary conductor so that no closed integration path is formed by the secondary winding; and

wherein said coils of said secondary winding are arranged astatically and as close to each other as possible for optimum external magnetic field compensation.

4,894,611

SYSTEM FOR MEASURING CHARACTERISTICS OF ELECTRON EMITTING SOURCES

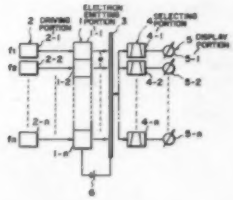
Isamu Shimoda, Zama; Mamoru Miyawaki, Tokyo; Akira Suzuki; Tetsuya Kaneko, both of Yokohama; Takeo Tsukamoto, Atsugi; Toshihiko Takeda, and Masahiko Okunuki, both of Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 27, 1988, Ser. No. 186,963

Claims priority, application Japan, Apr. 28, 1987, 62-103023

Int. Cl.[4] G01R *29/00, 31/26*

U.S. Cl. 324—158 R 8 Claims



1. A system for measuring characteristics of electron sources, said system comprising:

driving means for driving said electron sources at predetermined frequencies so that each electron source emits an electron flow;

collecting means for collecting the electron flows emitted from said electron sources;

selecting means for selecting and extracting signals having components corresponding to said predetermined frequencies, out of the electron flows as collected by said collecting means; and

measuring means for measuring an operation characteristic of an electron source responsive to the selection of, and corresponding to a signal selected by, said selecting means, independently from other electron sources.

4,894,612

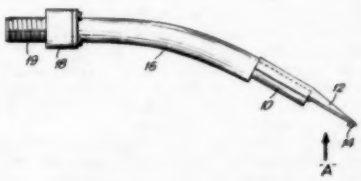
SOFT PROBE FOR PROVIDING HIGH SPEED ON-WAFER CONNECTIONS TO A CIRCUIT

Robert E. Drake, Somers; Sadeg M. Faris, Pleasantville; Roy M. Patt, Walden, and Zhi-Yuan Shen, Ossining, all of N.Y., assignors to Hypres, Incorporated, Elmsford, N.Y.

Continuation-in-part of Ser. No. 84,953, Aug. 13, 1987, abandoned. This application Sep. 23, 1988, Ser. No. 249,101

Int. Cl.[4] G01R *1/06*

U.S. Cl. 324—158 P 7 Claims



1. A soft miniaturized probe for providing a connection to an on-wafer circuit comprising:

a soft flexible substrate;

a center strip line disposed on a first surface of said substrate;

first and second ground planes, each disposed on said first surface of said substrate, one ground plane disposed on either side of said center strip line;

a plurality of contacts, one contact disposed on said center strip line and one contact disposed on said first ground plane, said contacts providing a conductive path between said on-wafer circuit and said strip line and between said on wafer circuit and said first ground plane; and

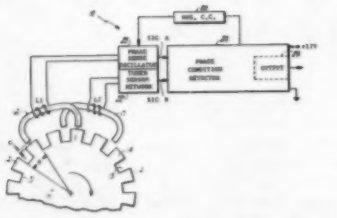
a metallic bridge disposed on said first surface of said soft flexible substrate in close proximity to said plurality of contacts electrically connecting said first and second ground planes which are disposed on either side of said center strip line.

4,894,613

INDUCTIVE SPEED SENSOR HAVING SWITCHING HYSTERESIS FOR INCREASING THE MAGNITUDE OF A PHASE SHIFT

Terumi Tsugawa, Fountain Valley, Calif., assignor to Hamilton Standard Controls, Inc., Farmington, Conn.

Filed Sep. 2, 1988, Ser. No. 240,783
Int. Cl.[4] G01P 3/48
U.S. Cl. 324—173 **6 Claims**



1. A speed detector apparatus for use in combination with a tone wheel having multiple metal teeth, the detector apparatus and tone wheel being adapted for relative displacement and further being susceptible to relative backward displacement, comprising:

an oscillator including a first inductive sensing coil adapted to be positioned adjacent to passing teeth on said tone wheel to thereby change inductance, the oscillator having a first output signal having a frequency determined at least partly by the inductance of said first coil, the oscillator further including means for providing said first output signal as a digital pulse waveform, the duty cycle of said digital waveform being at least partly a function of the DC voltage of the oscillator;

a tuned circuit interconnected with said oscillator and including a second inductive sensing coil, said tuned circuit being driven by said oscillator to provide a second output signal and said second inductive sensing coil being adaptive to be positioned adjacent to passing teeth on said tone wheel to thereby change inductance, the tuned circuit including means for providing said output signal as a digital pulse waveform, the duty cycle of said digital waveform being at least partly a function of the DC voltage of the tuned circuit;

said first and said second inductive sensing coils being offset from one another relative to the passing teeth on the toned wheel, such that their respective said changes of inductance are relatively out-of-phase;

the phase of said second output signal relative to said first output signal shifting and reversing cyclically as a function of the relative positioning of said teeth to the respective said first and second sensing coils during said relative displacement of the tone wheel;

means coupled to said oscillator and said tuned circuit for detecting a said reverse of said phase of one of said first and said second output signals relative to the other and thereby providing timing reference signals recurring at intervals representative of the relative speed of said tone wheel; and

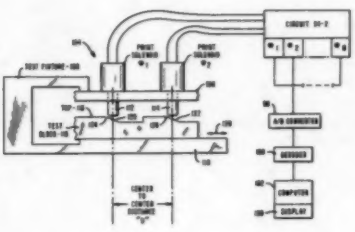
hysteresis circuit means connected between said phase-reversal detecting means and at least one of said oscillator and said tuned circuit for automatically adjusting said DC voltage of the respective said oscillator or said tuned circuit upon said detection of a phase reversal to thereby increase the magnitude of the phase shift.

4,894,614

APPARATUS FOR MEASURING THE CENTER-TO-CENTER DISTANCE BETWEEN POINT WIRES OF PRINT SOLENOIDS

John G. Mitchell, Trumansburg, N.Y., assignor to NCR Corporation, Dayton, Ohio

Division of Ser. No. 945,996, Dec. 24, 1986. This application Mar. 9, 1989, Ser. No. 321,027
Int. Cl.[4] G01B 7/14; B41J 9/38, 11/18
U.S. Cl. 324—208 **3 Claims**



1. An apparatus for measuring the centerline-to-centerline distance between first and second moveable members of first and second electromagnetic devices, respectively, comprising:

a mounting support for mounting said first and second moveable members thereon to establish a centerline-to-centerline distance between said first and second moveable members;

support means having a planar surface and also having means for supporting said mounting support so that the centerlines of said first and second moveable members are perpendicular to said planar surface;

a test block having a top surface and a bottom surface which are parallel to each other, said top surface having first and second bevel surfaces which are parallel to each other, spaced apart at a predetermined distance and extend from said top surface towards said bottom surface; and

a circuit coupled to said first and second electromagnetic devices for measuring the displacement of said first and second moveable members when the associated first and second electromagnetic devices are energized;

said circuit giving a first indication of the displacement of said first and second moveable members when the top surface of said test block is positioned in said support means to enable said first and second members to impact against said top surface when said first and second electromagnetic devices are energized, and said circuit also giving a second indication of the displacement of said first and second moveable members when said test block is moved in said support means to enable said first and second members to impact against first and second bevel surfaces, respectively, when said first and second electromagnetic devices are energized, with the difference in displacement of said first moveable member from said first and second indications and with the difference in displacement of said second moveable member from said first and second indication being used as a measure of said centerline-to-centerline distance.

4,894,615

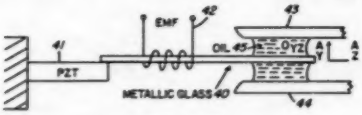
STRESS-RELIEVED AMORPHOUS METAL RIBBON MAGNETOMETER HAVING VISCOUS FLUID INTERFACE

Marc D. Mermelstein, Chevy Chase, Md., assignor to Geo-Centers, Inc., Newton Centre, Mass.

Continuation-in-part of Ser. No. 835,545, Mar. 3, 1986, Pat. No. 4,769,599. This application Mar. 11, 1988, Ser. No. 166,706

Int. Cl.[4] G01R *33/02, 33/00*

U.S. Cl. 324—244 **23 Claims**



1. A magnetometer for detecting an applied magnetic field comprising:

a magnetostrictive element having a longitudinal axis extending between opposing ends of the element;

means for supporting the element so that the element is free to vibrate longitudinally, said supporting means including a piezoelectric driver;

means for applying an oscillating electrical driving signal to the driver such that the driver applies an oscillating dither stress to the element which induces magnetization fluctuations along the longitudinal axis of the element of a magnitude proportional to the strength of an applied magnetic field;

means operated on by the magnetization fluctuations for producing an oscillating electrical measuring signal corresponding thereto;

means for detecting the measuring signal; and

a viscous fluid disposed between the magnetostrictive element and the supporting means for reducing the transmission of stresses at a frequency substantially below that of the driving signal which stresses introduce low-frequency noise and change the calibration by changing the piezomagnetic modulus of the element.

4,894,616

SELECTIVE EXCITATION METHOD FOR NMR IMAGING

Eiji Yoshitome; Kazuya Hoshino, and Susumu Kosugi, all of Tokyo, Japan, assignors to Yokogawa Medical Systems, Limited, Tokyo, Japan

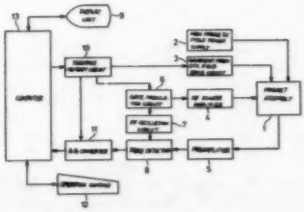
PCT No. PCT/JP87/00141, § 371 Date Sep. 27, 1988, § 102(e) Date Sep. 27, 1988, PCT Pub. No. WO87/05201, PCT Pub. Date Sep. 11, 1987

PCT Filed Mar. 6, 1987, Ser. No. 251,213

Claims priority, application Japan, Mar. 7, 1986, 86/50143

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—309 **3 Claims**



1. A selective excitation method for NMR imaging, comprising the steps of

applying an excitation RF signal to excite nuclear spins in a non-scan area of a subject;

spoiling an excited nuclear spin area with a gradient magnetic field;

collecting magnetic resonance data from an unspoiled scan area by applying an excitation RF signal and gradient magnetic field to the subject after the spoiling of the excited nuclear spin.

4,894,617

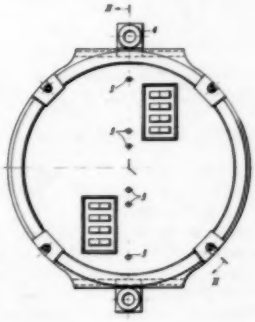
DEVICE FOR LOCATING STEEL RODS BURIED IN HIGH-DENSITY REINFORCED CONCRETE

Alessio Urbani, Monza, Italy, assignor to Ansaldo S.p.A., Genoa, Italy

Filed Apr. 25, 1988, Ser. No. 185,533

Int. Cl.[4] G01V *3/08, 3/10;* **G01N** *27/72;* **G01R** *33/12*

U.S. Cl. 324—329 **2 Claims**



1. A device for locating steel rods buried in a high-density reinforced concrete structure comprising:

a disk-shaped support having an upstanding peripheral rim, said support being movable over an area of a surface of said high-density reinforced concrete structure transversely to the direction of steel rods in said structure,

a disk-shaped cover seated on said upstanding rim,

an inductor coil fed with low frequency alternating current extending around the periphery of said support and generating a magnetic field in the surrounding area,

a plurality of small detector coils which detect an increase of the magnetic field generated by said inductor coil due to the presence of ferromagnetic material when passing over a steel rod buried in said structure, said detector coils being dispersed on said support within said inductor coil and being spaced apart from one another on a diameter of said inductor coil and located on opposite sides of the center of said inductor coil, and

a like plurality of signalling lamps on said cover in alignment with respective detector coils, thereby indicating the location of respective detector coils.

4,894,618

METAL DETECTOR USING CROSS-CORRELATION BETWEEN COMPONENTS OF RECEIVED SIGNALS

Bruce H. Candy, Basket Range, Australia, assignor to Minelab Electronic Industries Ltd., Adelaide, Australia

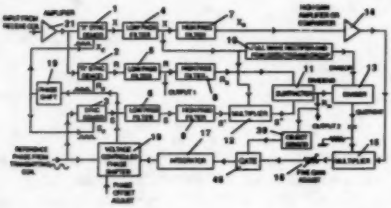
PCT No. PCT/AU86/00253, § 371 Date May 19, 1987, § 102(e) Date May 19, 1987, PCT Pub. No. WO87/01463, PCT Pub. Date Mar. 12, 1987

PCT Filed Aug. 29, 1986, Ser. No. 61,276

Claims priority, application Australia, Aug. 29, 1985, PH02201

Int. Cl.[4] G01V 3/11; G01R 33/12

U.S. Cl. 324—329 16 Claims



1. Apparatus for detecting remote metal objects in an interrogated environment by means of magnetic interrogation, comprising:

transmitting means for transmitting an alternating magnetic signal;

receiving coil means for receiving induced signals, which are in part from the transmitting means and from the interrogated environment;

means, connected to the receiving coil means, for amplifying the received signals.

first and second synchronous demodulator means connected to said amplifier means, for synchronously demodulating with respect to a transmitting frequency;

a first and second low-pass filter means, respectively receiving outputs of said first and second synchronous demodulator means;

a first and a second signal change determining means, respectively connected to outputs of said first and second low-pass filter means, for detecting changes in a magnitude of said first and second low-pass filter output signals;

means for cross correlating outputs of said first and second signal change determining means;

integrator means for integrating an output of said cross correlator means;

controlled phase shifter means receiving an output of said integrator means, for producing a controlled phase shift based thereon, a signal provided by said transmitting means being fed to an input of said controlled phase shifter means;

wherein an output of said controlled phase shifter means is fed to a reference input of said first synchronous demodulator means, and

first phase shifting means coupled to the controlled phase shifter means for shifting the output thereof, and for providing the shifted signal as a reference to said second synchronous demodulator means.

4,894,619

IMPULSE INDUCED EDDY CURRENT TYPE DETECTOR USING PLURAL MEASURING SEQUENCES IN DETECTING METAL OBJECTS

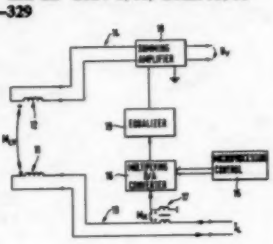
Erkki I. Leinonen, Vantaa, and Kari T. J. Aittoniemi, Espoo, both of Finland, assignors to Outokumpu Oy, Helsinki, Finland

Filed Jul. 22, 1987, Ser. No. 76,288

Claims priority, application Finland, Aug. 15, 1986, 863309

Int. Cl.[4] G01V 3/11; G01R 33/00

U.S. Cl. 324—329 9 Claims



1. A method for improving the signal/interference ratio and material identification in the detection of metal objects by detecting and measuring eddy currents induced in such objects, comprising: using an impulse-type metal detector of the type providing a signal representing detected current having a transmitter and a receiver, causing a cut-off peak signal of brief duration to result from mutual inductance between the transmitter and the receiver by cutting off a flow of current to the transmitter, detecting said cut-off peak signal with the receiver, automatically compensating for mutual inductance between the transmitter and the receiver by using a compensation circuit, conducting measurements of signals caused by the presence of a metal body in at least two measuring sequences within the brief duration of said cut-off peak and in at least one measuring sequence after the cut-off peak and including comparing a signal measured during said cut-off peak with a predetermined alarm limit, comparing a signal measured after said cut-off peak with a predetermined alarm limit, and activating an alarm only when both said alarm limits are surpassed.

4,894,620

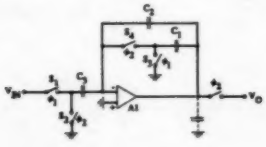
SWITCHED-CAPACITOR CIRCUIT WITH LARGE TIME CONSTANT

Krishnaswamy Nagaraj, Scotch Plains, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Apr. 11, 1988, Ser. No. 179,714

Int. Cl.[4] G06G 7/18; H03B 1/00

U.S. Cl. 328—127 8 Claims



1. An analog device including a first circuit, the first circuit comprising amplifying means, a switched capacitor network connected between a signal input and an input of the amplifying means and a first feedback capacitance connected between an output of the amplifying means and the input to the amplifying means,

said first circuit being CHARACTERIZED IN THAT the switched capacitor network comprises

a sampling capacitance switched during a first clock phase for sampling an input signal at the signal input for transferring the resulting sample charge to the first feedback capacitance and switched during a second clock phase to withdraw the same charge from the first feedback capacitance,

and wherein the first circuit is further CHARACTERIZED BY

a second feedback capacitance switched in one of the clock phases to acquire a charge proportional to the output voltage of the amplifying means and switched in other of the phases to distribute any charge acquired during said one clock phase with the first feedback capacitance.

4,894,621

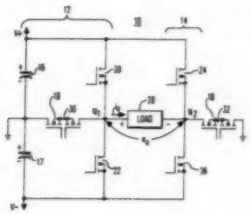
CIRCUIT FOR FIVE LEVEL WAVEFORM SYNTHESIS

Lawrence W. Koenig, Linthicum, and David W. Cripe, Pasadena, both of Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 13, 1988, Ser. No. 205,696

Int. Cl.[4] H03F *3/217*

U.S. Cl. 330—251 **4 Claims**



2. A power amplifier including a bridge circuit for outputting a periodic switching waveform containing five voltage levels, comprising:

a first half bridge;

a second half bridge connected to said first half bridge;

switching circuits, connected within said first and second half bridges of the bridge circuit, for switching between three different power supply voltages, the three different power supply voltages including a positive power supply voltage, a negative power supply voltage, and an intermediate power supply voltage between the positive and negative power supply voltages, said switching circuit of each of said first and second half bridges including:

a first switch connecting the positive power supply voltage and an output node;

a second switch connecting the negative power supply voltage and the output node; and

a third switch connecting the output node and the intermediate power supply voltage, said first and second switches being DC switches and said third switch being an AC bidirectional switch;

a capacitive circuit, connected to said switching circuits, for providing constant voltage to said switching circuits; and

load means connected between said third switch of each of said first and second half bridges.

4,894,622

INTEGRATED CURRENT-MIRROR ARRANGEMENT COMPRISING VERTICAL TRANSISTORS

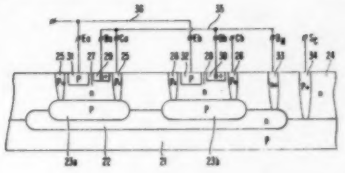
Pieter Buitendijk, Nijmegen, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 8, 1988, Ser. No. 281,565

Claims priority, application Netherlands, Jun. 15, 1988, 8801520

Int. Cl.[4] H03F *3/24*

U.S. Cl. 330—288 **6 Claims**



1. An integrated current-mirror arrangement comprising a first and a second transistor whose bases are interconnected and coupled to a collector of the first transistor, wherein the transistors are constucted as vertical transistors each having a collector region of a first conductivity type, isolated from a substrate of the first conductivity type by an intermediate layer of a second conductivity type, a connection being provided between said intermediate layer and the interconnected bases of the two transistors.

4,894,623

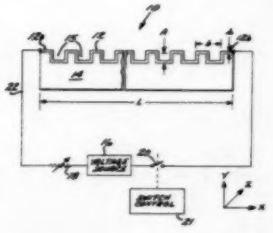
COMPACT TUNABLE RF GENERATOR USING A CURRENT CARRYING DIFFRACTION GRATING

David B. Chang, Tustin, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jul. 25, 1988, Ser. No. 223,990

Int. Cl.[4] H03B *28/00*

U.S. Cl. 331—96 **10 Claims**



1. A tunable generator of radio frequency (RF) electromagnetic energy, comprising:

a diffraction grating formed from an electrically insulative substrate comprising a plurality of aligned grooves, having a depth A, formed in said substrate;

a thin film of an electrically conductive material formed on said diffraction grating, said film having a thickness significantly less than depth A; and

means for applying a variable voltage to said conductive film so that a current flows in the film in a direction substantially perpendicular to the grooves of the

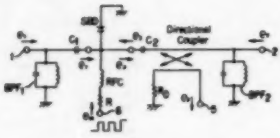
whereby RF energy is radiated from said film, the frequency of the radiation being dependent on the grating spacing and the magnitude of applied voltage.

4,894,624

COMBINED AMPLITUDE MODULATOR AND FREQUENCY CONVERTER

Akira Gokan, Oi, and Hiroshi Wakabayashi, Hanno, both of Japan, assignors to New Japan Radio Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 883,669, Jul. 9, 1986, abandoned. This application Jan. 4, 1988, Ser. No. 140,505
Claims priority, application Japan, Jul. 26, 1985, 60-115646
Int. Cl.[4] H03C 1/02
U.S. Cl. 332—164 **3 Claims**



1. A combined amplitude modulator and frequency converter comprising:

a non-linear solid state device having a conversion loss which varies in accordance with a DC bias applied thereto;

means for applying a first alternating current signal e_1 of frequency f_1 to a terminal of said device;

means for applying a second alternating current signal e_2 of frequency f_2 to said terminal of said device;

means for applying to said terminal of said device a modulating signal e_m comprising an amplitude modulated direct current voltage; and

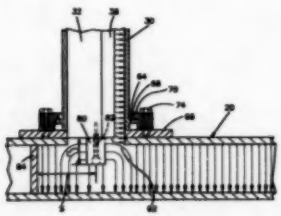
output circuit means connected to said terminal of said device for transmitting therefrom output signals of frequency $n_1f_1 \pm n_2f_2$, where n_1 and n_2 are integers, the output signals being modulated by the modulating signal e_m.

4,894,625

RECTANGULAR WAVEGUIDE TO CIRCULAR WRAPPED RECTANGULAR WAVEGUIDE TEANSITION

Rex L. Niekamp, and William A. Kerkhoff, both of Quincy, Ill., assignors to Harris Corporation, Melbourne, Fla.

Filed Nov. 29, 1988, Ser. No. 277,230
Int. Cl.[4] H01P 5/02
U.S. Cl. 333—33 **9 Claims**



1. Apparatus for providing a direct waveguide to waveguide transition coupling between a first rectangular waveguide and a second circular wrapped rectangular waveguide with both waveguides operating in a TE_{10} mode, comprising

said second waveguide includes an elongated metallic annular wall having an upper end and a lower end and a partition member extending radially inward from said annular wall and having an inner edge thereof located near the central axis of said annular wall and extending longitudinal for a length corresponding with that of said annular wall,

an elongated metal probe having one end secured to the lower end of said particular member at a location corresponding with said central axis and extending beyond said lower end;

said first rectangular waveguide having parallel rectangular broad walls interconnected by narrower narrow walls, said rectangular waveguide being oriented perpendicular to the axis of said annular wall and having a circular aperture in one of said broad walls facing said lower end, said circular aperture being in coaxial alignment with said annular wall; and

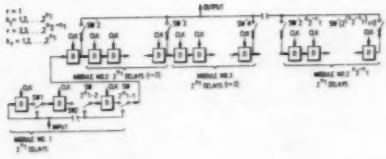
means securing said first and second waveguides together with said probe extending through said aperture into the interior of said first waveguide.

4,894,626

VARIABLE LENGTH SHIFT REGISTER

James J. Kubinec, Incline Village, Nev., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Sep. 30, 1988, Ser. No. 251,724
Int. Cl.[4] H03K 5/14, 5/139
U.S. Cl. 333—101 **7 Claims**



1. Apparatus for providing variable length time delays of Δt, $2\Delta t$, $3\Delta t$, . . . , $MN\Delta t$, where Δt is a predetermined time interval and M and N are predetermined positive integers with $N \geq 2$, the apparatus comprising:

first time delay means, having an input terminal, a clock input terminal, an output terminal and a first plurality of programmable switch means, with each switch means having a first state and a second state, for producing a time delay of any of the lengths Δt, $2\Delta t$, $3\Delta t$, . . . , $M\Delta t$ by programming of the first plurality of programmable switch means, with the input terminal of the first time delay means receiving the signal that is to be delayed in time; and

second time delay means, having an input terminal connected to the output terminal of the first time delay means, a clock input terminal, and output terminal and a second plurality of programmable switch means, with each switch means having a first state and a second state, for producing a time delay of any of the lengths 0, $M\Delta t$, $2M\Delta t$, . . . , $(N-1)\,M\Delta t$ at the output terminal of the second time delay means, where at most one programmable switch means from the first time delay means and precisely one programmable switch means from the second time delay means is programmed to be in a first state for any operation of the apparatus; and

a source of periodic clock pulses having a clock cycle of length substantially Δt that is connected to the clock input terminal of each of the first time delay means and the second time delay means.

4,894,627

DIRECTIONAL WAVEGUIDE-FINLINE COUPLER

Robert C. Kane, Woodstock, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

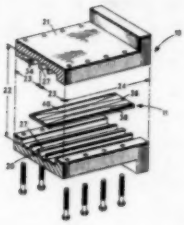
Filed Jan. 3, 1989, Ser. No. 292,980
Int. Cl.[4] H01P 5/18
U.S. Cl. 333—113 **9 Claims**

1. A directional energy coupler for transferring radio frequency energy traveling in a first waveguide to an adjacent second waveguide, said first and second waveguides having

substantially rectangular cross-sections, and a common wall separating said waveguides said coupler comprised of:

first mode converter means for converting waveguide-mode radio-frequency energy in said first waveguide to finline-mode radio-frequency energy in said first waveguide; and,

energy coupling means for coupling finline-mode radio-frequency energy from said first mode converter means in said first waveguide to finline-mode radio-frequency energy in said second waveguide, said energy coupling means being a single elongated slot oriented with its widest dimension orthogonal to said waveguide cross-sections, said slot separating said common wall into first and second sections.



4,894,628

TRANSMISSION DELAY LINE AND METHOD OF MANUFACTURE

Peter J. Dadswell, Gawler, Australia, assignor to The Commonwealth of Australia, Canberra, Australia

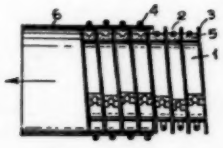
PCT No. PCT/AU87/00104, § 371 Date Dec. 2, 1987, § 102(e) Date Dec. 2, 1987, PCT Pub. No. WO87/06065, PCT Pub. Date Oct. 8, 1987

PCT Filed Apr. 2, 1987, Ser. No. 163,966

Claims priority, application Australia, Apr. 2, 1986, PH5293

Int. Cl.[4] H01P *9/00, 9/02, 11/00*

U.S. Cl. 333—160 **15 Claims**



1. A coaxial transmission delay line, comprising:

a cylindrical tube of electrically-conductive material having a radially outwardly-extending helical wall cycling helically thereabout between axially opposite ends of said cylindrical tube on a radially outer peripheral surface of said cylindrical tube, said helical wall having a radially outer edge which is disposed a constant radial distance from said radially outer peripheral surface of said cylindrical tube, successive turns of said helical wall being axially spaced so as to define a helical slot of space;

a sleeve of electrically-conductive material radially surrounding said helical wall between said axially opposite ends of said cylindrical tube, said sleeve having a radially inner peripheral surface engaging said radially outer edge of said helical wall, thereby defining a radially outer limit to said helical slot of space so that said helical slot of space forms a helical channel having a given transverse cross-sectional shape, viewed on a longitudinal section of said coaxial transmission delay line;

support means made of low density dielectric material, said support means being received in said helical channel so as to be present at at least a plurality of sites per helical turn of said helical channel, said support means being supported from said radially outer peripheral surface of said cylindrical tube and having a thickness, extending radially outwardly of said radially outer peripheral surface of said cylindrical tube, which is less than said constant radial distance, whereby a helical gap remains between a radially outer surface of said support means and said radially inner peripheral surface of said sleeve;

means defining a radially outwardly-facing seat means on said support means, said seat means being located laterally intermediate respective adjacent turns of said helical wall, said seat means extending helically with said helical channel so as to be located generally centrally of said helical channel at said sites;

a single center conductor formed in a helix and extending helically of said cylindrical tube, generally between said opposite ends of said cylindrical tube, in said gap of said helical channel, supported in said seat means of said support means;

said single center conductor being so sized that a portion of said gap between said single center conductor and respective adjacent turns of said helical wall and between said single center conductor and said radially inner peripheral surface of said sleeve, remains unoccupied;

said unoccupied portion of said gap provides an unbroken and unimpeded helical passageway for an introduced gas between opposite ends of said coaxial transmission delay line.

4,894,629

BANDPASS FILTER HAVING MAGNETICALLY COUPLED RESONATORS

Hisatake Okamura; Teruhisa Tsuru, and Masahiko Kawaguchi, all of Nagaokakyo, Japan, assignors to Murata Manufacturing Co., Ltd., Kyoto, Japan

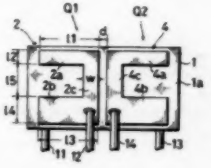
Filed Mar. 2, 1987, Ser. No. 21,051

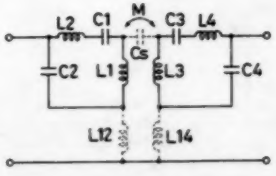
Claims priority, application Japan, Mar. 4, 1986, 61-46856; Apr. 25, 1986, 61-97316; Jan. 22, 1987, 62-12929; Jan. 22, 1987, 62-12930

The portion of the term of this patent subsequent to Jun. 28, 2005, has been disclaimed.

Int. Cl.[4] H03H *7/09*

U.S. Cl. 333—177 **15 Claims**





1. A bandpass filter comprising:

a plurality of resonators; and

a magnetic induction coupling being established between adjacent pairs of said resonators, wherein each of said resonators includes

an LC series circuit, and

first capacitance element connected in parallel to said LC series circuit,

said LC series current including a second capacitance element and two inductance elements, said second capacitance elements connected in series between said two inductance elements, and

said magnetic induction coupling being provided by a coupling between at least one of said inductance elements of each adjacent pair of said resonators.

4,894,630

CONVERSION ADAPTER

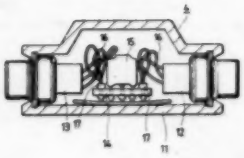
Masamichi Ueta, and Yukihiro Kobayashi, both of Osaka, Japan, assignors to NEC Home Electronics Ltd., Osaka, Japan

Filed Nov. 23, 1988, Ser. No. 275,747

Claims priority, application Japan, Nov. 28, 1987, 62-181773

Int. Cl.[4] H03H 7/01

U.S. Cl. 333—185 **5 Claims**



1. A conversion adapter comprising:

first and second connectors each including means defining a predetermined number of pin connections on one side thereof and wires electrically connected to said pin connections and extending from another side thereof;

an adapter frame body for supporting said first and second connectors such that said first and second connectors are spaced from one another and said pin connections of each of said first and second connectors face in directions opposite each other and have different pin connection configurations with respect to each other;

a printed circuit board disposed between said first and second connectors;

at least one noise filter arranged on said printed circuit board; and

board-in connector elements coupled to said wires for connecting said wires from said first and second connectors to said printed circuit board to connect said first and second connectors to respective sides of said at least one noise filter arranged on said printed circuit board.

4,894,631

MOLDED CASE CIRCUIT BREAKER ACTUATOR-ACCESSORY UNIT

Roger N. Castonguay, Terryville; Joseph G. Nagy, Plainville; Richard E. Bernier, Southington; Ronald D. Ciarcia, Bristol, and Keith W. Klein, Simsbury, all of Conn., assignors to General Electric Company, New York, N.Y.

Filed Sep. 6, 1988, Ser. No. 240,885

Int. Cl.[4] H01H 9/20

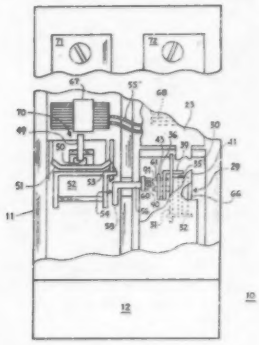
U.S. Cl. 335—167 **24 Claims**

1. A molded case circuit breaker having a combined trip actuator and accessory unit comprising:

a molded case circuit breaker case and cover;

a circuit breaker operating mechanism arranged for separating a pair of contacts to interrupt circuit current through said contacts;

a trip actuator-accessory unit within a recess in said circuit breaker cover proximate said operating mechanism and including a trip actuator latch and a reset lever pivotally attached to a support housing for articulating said operating mechanism to separate said contacts automatically upon overcurrent conditions through said contacts, said reset lever and said trip actuator latch each comprising a radial cam surface for receiving and guiding a trip latch pin and allowing said trip actuator latch and said reset lever to move in unison with said trip latch pin;



an operating lever within said case proximate said operating mechanism and interfacing with said actuator-accessory unit through a latch support arm, said latch support arm including a latch pin being retained by said trip actuator latch in the absence of said overcurrent conditions through said contacts; and

an electromagnetic coil and a spring-biased plunger within said actuator-accessory unit, said plunger being restrained from moving said trip actuator latch away from said latch pin.

4,894,632

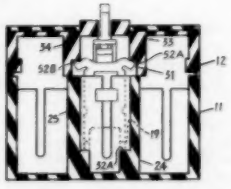
MOLDED CASE CIRCUIT BREAKER OPERATING MECHANISM FOLD-DOWN ARRANGEMENT

Roger N. Castonguay, 5 Ellen Dr., Terryville, Conn. 06786, and David J. Meiners, 186 Pondview Dr., Southington, Conn. 06489

Filed Nov. 21, 1988, Ser. No. 274,224

Int. Cl.[4] H01H 9/02

U.S. Cl. 335—202 **10 Claims**



1. A molded case circuit breaker comprising:

a molded plastic case and cover forming an enclosure;

a pair of separable contacts within said enclosure arranged for separation upon occurrence of an overcurrent condition through said contacts; and

an operating mechanism within said enclosure intermediate an operating handle and said separable contacts, said operating mechanism including latch means for retaining said separable contacts from being separated in the ab-

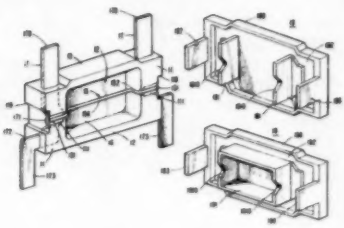
sence of said over-current condition, said operating mechanism including a pair of arms extending from a top part of said operating mechanism interacting with said cover to retain said operating mechanism within said enclosure said arms becoming deformed when said cover is attached to said case.

4,894,633

FUSE APPARATUS

Richard P. Holtfreter, Columbus, Ohio, assignor to American Telephone and Telegraph Company, New York, N.Y.

Filed Dec. 12, 1988, Ser. No. 282,789
Int. Cl.[4] H01H *85/34*
U.S. Cl. 337—278 **17 Claims**



1. An electrical fuse comprising

a fuse element for interrupting an electrical circuit upon an occurrence of a fault condition in the electrical circuit, and

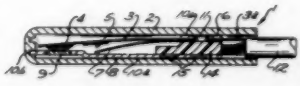
means having externally projecting terminal means engaging said fuse element with an air cavity formed therein and with cover means having an arc-suppressant structure internally extending into said air cavity and wedged against opposing side walls of said air cavity holding said terminal means for supporting and deflecting said fuse element between said arc-suppressant structure and said opposing side walls of said air cavity to shield said terminal means from voltage arcs occurring upon a failure of the fuse element in response to the fault condition.

4,894,634

SWITCH DEVICE

Masakazu Nezuka, Gotemba; Yuji Saito, Susono, and Yasuhiro Sato, Gotemba, all of Japan, assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 19, 1988, Ser. No. 259,833
Int. Cl.[4] H01H *37/74, 37/54*
U.S. Cl. 337—343 **4 Claims**



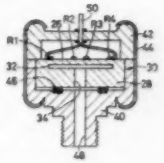
1. A switch device comprising a housing forming a switch chamber, a stationary electrical contract mounted in the housing, an elongated movable contact arm having two opposite ends, one end mounting thereon a movable electrical contact adapted to move into and out of engagement with the stationary contact to respectfully close and open an electrical circuit, a bimetallic member having two opposite ends, a support mounted in the housing, an end of the bimetallic member and the other end of the movable contact arm placed one on top of the other and cantilever mounted on the support, a heat sink member mounted in heat transfer relationship with the cantilever mount of the movable contact arm and the bimetallic member, the movable contact arm and the bimetallic member both extending into the switch chamber in generally the same direction but with the free end of the bimetallic member spaced from the movable contact arm during normal operating conditions, the movable contact being biased into engagement with the stationary contact during normal operating conditions and the bimetallic member deformable in dependence on variations in its temperature so that with increasing temperature the free end of the bimetallic member moves toward the movable contact arm.

4,894,635

STRAIN SENSOR

Yasuhita Yajima; Kazuyoshi Shitaba, both of Nagoya, and Syunzo Mase, Aichi, all of Japan, assignors to NGK Insulators, Ltd., Nagoya, Japan

Filed May 24, 1988, Ser. No. 198,085
Claims priority, application Japan, May 27, 1987, 62-130878
Int. Cl.[4] G01L *1/22*
U.S. Cl. 338—2 **6 Claims**



1. A strain sensor including a ceramic substrate deformable in response to a stress exerted thereon, and an electrically resistive layer formed on the ceramic substrate, a strain of the ceramic substrate caused by the stress being detected as a change in a resistance value of the electrically resistive layer, wherein the improvement comprises:

said electrically resistive layer having a composition which includes a dielectric material selected from the group consisting of glasses and ceramics, and at least one principal electrically conductive component in the form of a powder selected from the group consisting of: borides, carbides and nitrides and silicates of Ti, Zr, Hf, V, Nb, Ta, Cr, Mo and W; borides of Y, Sc and lanthanide series; BN; B_4C; SiC; and Si_3N_4.

4,894,636

OIL LEAKAGE DETECTION DEVICE

Hiroyuki Sugibuchi, and Juji Akiba, both of Saitama, Japan, assignors to Junkosha Co., Ltd., Japan

Filed Oct. 21, 1988, Ser. No. 260,497
Claims priority, application Japan, Jan. 28, 1988, 63-9909[U]
Int. Cl.[4] H01C *7/06*
U.S. Cl. 338—9 **1 Claim**

1. Oil leakage detection apparatus having a detection unit comprising: (a) an oil leakage detecting sensor which exhibits a positive resistance-temperature characteristic in response to changes in temperature, connected, in series, to (b) an oil leakage detecting sensor which exhibits a negative resistance-temperature characteristic in response to changes in temperature.

4,894,637

POSITIVE TEMPERATURE COEFFICIENT THERMISTOR DEVICE

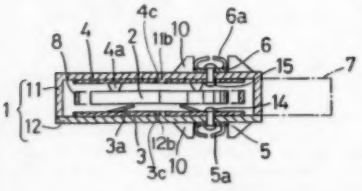
Yoshihiro Yamada, Ohmihachiman; Yuichi Takaoka, Shiga; Masahito Mihara, and Takashi Shikama, both of Yokaichi, all of Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Sep. 6, 1988, Ser. No. 240,926

Claims priority, application Japan, Sep. 7, 1987, 62-223817

Int. Cl.[4] H01C 7/10

U.S. Cl. 338—22 R 10 Claims



1. A positive temperature coefficient thermistor device comprising:

a substantially thermally and electrically insulating case,

a positive temperature coefficient thermistor element disposed in said case,

a pair of first terminals disposed in said case and having electrodes extending from said first terminals and in contact with corresponding respective portions of said thermistor element,

a pair of second terminals respectively connected with said first terminals, and connecting means for electrically connecting said first terminals with said second terminals, wherein said second terminals are mounted on an outer surface of said case opposite said respective first terminals and said connecting means comprises a pair of pin members which penetrate said case to mechanically and electrically connect the first terminals with the second terminals.

4,894,638

POTENTIOMETER HAVING VIBRATION DAMPING MEANS

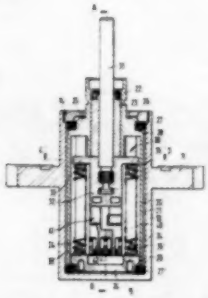
Werner Flierl, Höhenkirchen, and Horst Pissulla, Ottobrunn, both of Fed. Rep. of Germany, assignors to Wilhelm Ruf Kg, Munich, Fed. Rep. of Germany

Filed Apr. 29, 1988, Ser. No. 187,775

Claims priority, application Fed. Rep. of Germany, Apr. 29, 1987, 3714348

Int. Cl.[4] H01C 10/32

U.S. Cl. 338—162 19 Claims



1. A potentiometer that can be attached to an object that can vibrate and used to produce an electrical signal responsive to a signal from said object comprising:

an outer housing;

an inner housing disposed substantially within said outer housing;

damping means disposed between said inner housing and said outer housing for damping vibrations;

a resistor plate having at least one resistor path attached to said inner housing;

actuating means for detecting said signal;

electrically conductive sliding means attached to said actuating means for contacting said at least one resistor path at a location that corresponds to said position;

an electrical output disposed on said outer housing for outputting said electrical signal;

a plurality of electrodes disposed within said inner housing that are electrically connected to said at least one resistor path and said sliding means; and

means for establishing an electrical connection between said electrical output and said plurality of electrodes, said electrical connection means also being flexible enough to withstand vibrations between said inner housing and said outer housing.

4,894,639

PRESSURE SWITCH FOR MONITORING TIRE PRESSURE, PARTICULARLY OF MOTOR VEHICLE TIRES

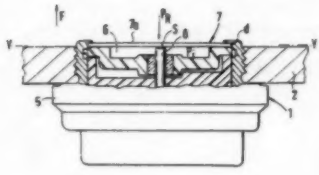
Wolfgang Schmierer, Pforzheim, Fed. Rep. of Germany, assignor to Dr. Ing. h.c.F. Porsche AG, Weissach, Fed. Rep. of Germany

Filed Mar. 24, 1989, Ser. No. 328,541

Claims priority, application Fed. Rep. of Germany, Mar. 30, 1988, 3810763

Int. Cl.[4] B60C 23/00

U.S. Cl. 340—444 20 Claims



1. A pressure switch for monitoring tire pressure of motor vehicle tires, which is fastened at a wheel rim of the tire and is actuated by inflating pressure in the tire, comprising:

a reference pressure chamber which faces in the direction of the tire and is sealed off from the tire by an electrically conductive switching diaphragm;

the chamber supports a contact pin which interacts with this switching diaphragm to close an electric circuit between the pin and diaphragm; and

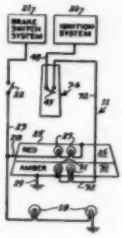
the switching diaphragm has applied to it a force responsive to the tire pressure and a mass which is controlled as a function of centrifugal force indicative of tire rotational speed so that closing points of the pressure switch are determined by tire pressure that varies automatically with tire rotational speed.

4,894,640

REAR SIGNAL LIGHT SYSTEM FOR AUTOMOTIVE VEHICLES

Jerry W. Beasley, 645 Dutchman Dr., and Robert H. Jennings, 4368 Baton Rouge Dr., both of Hermitage, Tenn. 37076

Filed Mar. 17, 1986, Ser. No. 840,196
Int. Cl.[4] B60Q 1/26
U.S. Cl. 340—464 **3 Claims**



1. A signal light system for an automotive vehicle having a rear portion, an electrical brake switch system, a carburetor, an accelerator link arm cooperatively connected to the carburetor, and an electrical ignition system, comprising:

(a) an electrical amber warning lamp,

(b) means mounting said amber warning lamp in the rear portion of an automotive vehicle and visible to the rear of said vehicle,

(c) an accelerator pedal member comprising a pedal housing having an upper portion and a lower portion, an enclosing bottom wall and side walls, and a treadle on said upper portion, defining a hollow space within said pedal housing, guide post means connecting said treadle to said bottom wall, and spring coil means surrounding said guide post means and biasing said treadle upward upon the absence of downward pressure by the operator's foot,

(d) means mounting said bottom wall of said pedal housing on the accelerator link arm of a motor vehicle,

(e) an accelerator electrical switch member comprising a microswitch having a switch casing,

(f) means fixing said switch casing on said bottom wall within said hollow space,

(g) said microswitch having a normally closed circuit position and an open circuit position,

(h) said microswitch member comprising a movable switch actuator projecting upward from said switch casing in the upper portion of said pedal housing and adapted to change the mode of said microswitch between said closed circuit position and said open circuit position,

(i) said microswitch being electrically connected in series solely between the electrical ignition system of the automotive vehicle and said amber warning lamp,

(j) an electrical red warning lamp,

(k) means mounting said red warning lamp in the rear portion of said automotive vehicle, and visible to the rear of said vehicle,

(l) said red warning lamp electrically connected in the electrical brake switch system of said automotive vehicle for illumination solely when said brake switch system is energized,

(m) said switch actuator being adapted to move downward to change the mode of said microswitch to said open circuit position simultaneously with the downward pressure on said switch actuator by the operator's foot on said treadle, whereby said amber lamp is not illuminated, and

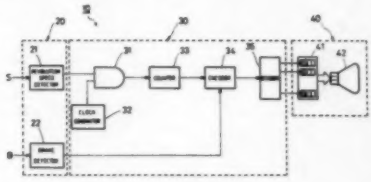
(n) said switch actuator being adapted to move upward to change the mode of said microswitch to said closed circuit position when the downward pressure on said switch actuator by the operator's foot on said treadle has been removed, to continuously illuminate said amber lamp as long as said microswitch is in said closed circuit position, the illumination of said amber warning lamp and said red warning lamp being independent of each other.

4,894,641

REAL-TIME SPEED DISPLAY APPARATUS

Bill Yang, Taipei, Taiwan, assignor to Cotron Corporation, Taipei, Taiwan

Filed Jan. 24, 1989, Ser. No. 301,051
Int. Cl.[4] B60Q 1/54
U.S. Cl. 340—466 **6 Claims**



1. A real-time display apparatus for displaying the speed of a vehicle having a transmission shaft, with lights of different colors, comprising:

detection means for detecting the speed of the vehicle, said detection means including means, responsive to rotation of the transmission shaft of the vehicle, for outputting a speed signal in the form of a pulse signal having a pulse rate which varies as a function of the speed of revolution of the transmission shaft;

control means coupled to said detection means for generating a display control signal in response to the speed signal, said control means including

a clock generator for generating a clock signal,

a timing gate having first and second inputs respectively electrically connected to said detection means and said clock generator, for converting the speed signal into a periodic signal having the same number of pulses as that of the speed signal during predetermined periods of time, the periods of time being controlled by the clock signal,

a counter, electrically connected to said timing gate, for counting the number of pulses of the periodic signal during each of the predetermined periods of time,

an encoder, connected to said counter, for encoding the count of said counter at the end of each predetermined period of time to obtain a sequence of code signals, and

a decoder, connected to said encoder, for decoding the sequence of code signals to obtain the display control signal; and

display means, coupled to said control means, for generating different colors of light in response to the display control signal.

4,894,642

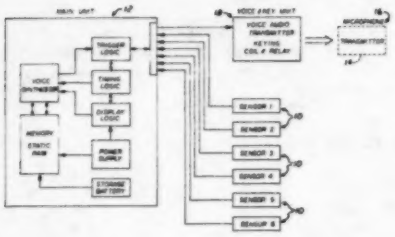
VOICE SECURITY SYSTEM

Charles F. K. Ashbaugh, and Neal K. Henderson, both of Tampa, Fla., assignors to Cyclone Corporation, Tampa, Fla.

Filed Nov. 3, 1988, Ser. No. 266,814
Int. Cl.[4] G08B 19/00
U.S. Cl. 340—539 **3 Claims**

1. An improved voice security system of the type including a remote signalling apparatus having at least one sensor for detecting a predetermined condition and generating a signal in response to a sensed condition, logic circuit means for receiving the signal, and voice synthesizer means for generating an audible message in response to the sensed condition wherein the improvement comprises means for transmitting the audible

message to a remote location utilizing a two-way radio having a microphone, said means comprising a voice and key unit



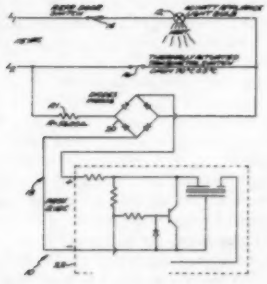
interposed between said voice synthesizer and said microphone of said two way radio.

4,894,643

APPLIANCE DOOR ALARM APPARATUS

Herbert A. Thompson, Cumberland, and Glenn J. Doell, No. Providence, both of R.I., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Apr. 28, 1989, Ser. No. 344,779
Int. Cl.[4] G08B *23/00*
U.S. Cl. 340—593 **7 Claims**



1. An appliance door alarm indicator system for providing an indication that a door has been left ajar for longer than a preselected period comprises a heat generating light bulb, a normally closed thermostatic switch mounted in heat transfer relation with the light bulb, an appliance door switch adapted to be closed when the appliance door is open and open when the appliance door is closed, the door switch electrically connected in series with the light bulb and the thermostatic switch, an electrically energizable alarm indicator coupled across the thermostatic switch so that when the thermostatic switch receives sufficient heat from the bulb to cause it to move to an open contacts position the alarm indicator is concomitantly energized.

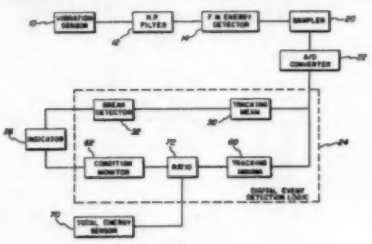
4,894,644

TOOL BREAK/WEAR DETECTION USING A TRACKING MINIMUM OF DETECTED VIBRATIONAL SIGNAL

Charles E. Thomas, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Oct. 4, 1988, Ser. No. 253,026
Int. Cl.[4] G08B *21/00*
U.S. Cl. 340—680 **19 Claims**

1. A method of detecting machining tool wear comprising the steps of sensing vibration energy produced upon machining a workpiece with said tool; generating an electrical vibration signal corresponding to the sensed vibration energy; processing the vibration signal to produce a tracking minimum signal which tracks the minimum values of the vibration signal; com-



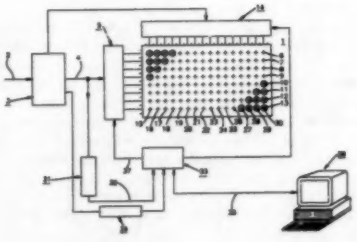
paring the tracking signal to a predetermined threshold level; and indicating in response to the comparing, the tracking signal attaining a predetermined level relative to the predetermined threshold level.

4,894,645

INCANDESCENT MATRIX DISPLAY WITH HIGH FREQUENCY LAMP DRIVING

Lars B. G. Odlen, Stockholm, Sweden, assignor to Prisma Skyltreklam AB, Sweden

Filed May 27, 1988, Ser. No. 199,527
Claims priority, application Sweden, Jun. 3, 1987, 8702307
Int. Cl.[4] G09F *9/32*; H04N *3/12*
U.S. Cl. 340—780 **4 Claims**



1. An electronic sign with a number of light bulbs provided in rows and columns, the bulbs being turned on either row-by-row or column-by-column, the electronic sign comprising:

a switched mains unit for receiving a mains voltage having a mains frequency and for providing an alternating current to operate the bulbs, the frequency of the alternating current substantially exceeding the mains frequency; and

a logic unit for controlling the row and column operation, the shifting of the row and column operation being synchronized with the alternating current from the switched mains unit.

4,894,646

METHOD AND SYSTEM FOR PROCESSING A TWO-DIMENSIONAL IMAGE IN A MICROPROCESSOR

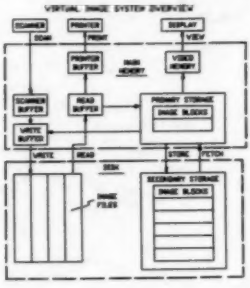
Arthur G. Ryman, Toronto, Canada, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 19, 1987, Ser. No. 122,827

Claims priority, application Canada, Mar. 30, 1987, 533370

Int. Cl.[4] G09G *1/16*

U.S. Cl. 340—747 **21 Claims**



1. An image processing system including a display device, a first store and a second store,

means for loading digital representations of images to be displayed into said first and second stores, each said image being subdivided into a plurality of sub-images,

a table associated with each image and each sub-image, each said table associated with each image defining view characteristics for said associated image, each said table for each said sub-image defining view characteristics for said associated sub-image,

means for selecting a view of a stored image for display on said display device as a viewed image having view characteristics, said selecting means accessing said view of said stored image by selecting sub-images for display, said selecting means including means for comparing said view characteristics of said viewed image to said view characteristics of a selected sub-image and means for changing said view characteristics of said selected sub-image to the view characteristics of said viewed image before displaying said sub-image.

4,894,647

SCINTILLATING HANDLE FOR BEVERAGE TAP

Donald M. Walden, Jr., Franklin, and John P. Glueckstein, Hubertus, both of Wis., assignors to Everbrite Electric Signs, Inc., Greenfield, Wis.

Filed Jan. 11, 1988, Ser. No. 142,026

Int. Cl.[4] G09G *3/00*

U.S. Cl. 340—815.200 **2 Claims**

1. A scintillation device for operating a tap for dispensing liquid, said device comprising:

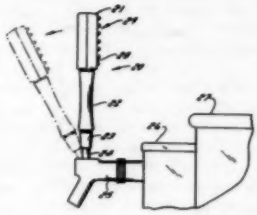
handle means and means for coupling said handle means to said tap such that when said handle means is tilted from an inactive position to an active position said tap is caused to open for dispensing a liquid,

said handle means comprises a casing and a stem joined to said casing, said stem having said means for coupling said handle means to said tap,

a display comprised of a plurality of electrically activated light emitting elements arranged in a pattern and mounted to said handle means,

electronic circuit means mounted on said handle means and having electrical connections to said light emitting elements, said circuit means including switch means responsive to said handle means being tilted by closing to activate said circuit means to initiate repeatable scintillation sequences wherein said circuit means energizes some of said light emitting elements and concurrently deenergizes other of said elements cyclically,

said circuit means being mounted in said casing,



face plate means applied to said casing for enclosing the same,

said light emitting elements projecting from said face plate means.

4,894,648

INFORMATION HANDLING AND CONTROL SYSTEMS, AND METHODS OF TESTING THE CONDITION OF ELECTRICAL LOADS IN SUCH SYSTEMS

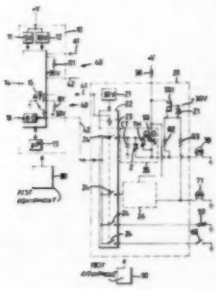
Kevin T. Talbot, Lichfield, England, assignor to Salplex Limited, England

Filed Sep. 6, 1988, Ser. No. 240,502

Claims priority, application United Kingdom, Sep. 21, 1987, 8722194

Int. Cl.[4] H04Q *9/00*

U.S. Cl. 340—825.060 **25 Claims**



1. An information handling and control system comprising:

(a) at least one power switch provided in a local unit to control a high current each to a respective load;

(b) a low current signalling link provided between the local unit and a remote intelligent unit;

(c) at least one capacitor provided in the local unit each connected to the control electrode of a respective said power switch;

(d) means provided in the local unit for connecting each capacitor to the signalling link during a respective time slot assigned to the respective power switch in successive frame periods;

(e) drive voltage means provided in the intelligent unit for applying a first or a second drive voltage within a said respective assigned time slot respectively to charge or discharge said respective capacitor to a high or a low voltage value sufficient respectively to turn the respective power switch on or off, the respective capacitor maintaining the respective power switch continuously on or con-

tinuously off between successive frame periods when the respective load is in normal condition;

(f) charging means provided in the local unit effective to charge each said capacitor to an intermediate voltage value only when the respective load is in open-circuit condition following the respective capacitor being discharged to said low voltage value by said second drive voltage and while no drive voltage is applied to the respective capacitor from the drive voltage means; and

(g) detection means provided in the intelligent unit which are operable to detect the condition of each said capacitor at a time in a selected said respective assigned time slot when the respective capacitor will be at said intermediate voltage value if the respective load is in open-circuit condition and hence to detect whether or not the respective load is in open-circuit condition.

4,894,649

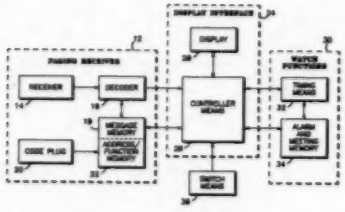
PAGER HAVING TIME CONTROLLED FUNCTIONS

Walter L. Davis, Coral Springs, Fla., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 7, 1988, Ser. No. 141,457

Int. Cl.[4] H04Q 7/00

U.S. Cl. 340—825.44 **8 Claims**



1. A portable communication device comprising:

a receiver for receiving selective call paging signals and messages;

programmable timing means, for generating time signals and at least a first control signal starting at a first predetermined time for a first predetermined time interval, and a second control signal further starting at a second predetermined time for a second predetermined time interval;

memory means, having an address memory area for storing at least first and second predetermined addresses;

controller means, coupled to said memory means, and responsive to said first control signal for enabling the selection of the first predetermined address during the first predetermined time interval, and further responsive to the second control signal for enabling the selection of the second predetermined address during the second predetermined time interval;

a decoder, responsive to the received selective call paging signals matching the predetermined address selected during the first and second predetermined time intervals, for generating an alert control signal in response thereto; and

alerting means, responsive to the alert control signal for generating a sensible alert.

4,894,650

CONTROL UNIT FOR MANUALLY CONTROLLING REVERSIBLE ELECTROMECHANICAL ADJUSTING DEVICES

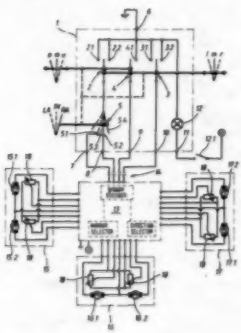
Karl-Heinz Krieg, Ebersbach, and Siegfried Klink, Schönaich, both of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Stuttgart, Fed. Rep. of Germany

Filed Jun. 2, 1988, Ser. No. 203,319

Claims priority, application Fed. Rep. of Germany, Jun. 27, 1987, 3721267

Int. Cl.[4] H04Q 1/00

U.S. Cl. 340—825.52 **10 Claims**



1. A control unit for manually controlling reversible electromechanical adjusting means used for adjusting the position of three motor vehicle rear view mirrors, comprising:

a switch arrangement means moved by a single moveable lever means for positioning a first selecting switch means movable contact bridge means which rests against a first fixed contact in one of three switching positions and against a second fixed contact in another of said switching positions;

and for also positioning three key switch means wherein at least a first and a second of these key switch means are change-over key switch means having one moveable contact bridge each, which can be switched to a first or to a second fixed contact depending on a direction of movement of the lever;

the moveable contact bridge of the first change-over key switch means being electrically and permanently connected to the moveable contact bridge of the selecting switch means and moved jointly with a least one other moveable contact bridge of one of the other two switch means;

said third key switch means also having a moveable contact bridge and a first fixed contact;

a common connecting terminal which is electrically and permanently connected to each of the fixed contacts of each of three key switch means;

four further connecting terminal means which are individually and permanently connected, with the first of the four further connecting terminal means being connected to the first fixed contact of the selecting switch means, the second of the four further connecting terminal means connected to the second fixed contact of the selecting switch means, the third of the four further connecting terminal means connected to the moveable contact bridge means of the second key switch means and the fourth of the four further connecting terminal means connected to the moveable contact bridge means of the third key switch means;

the moveable contact bridge means of the selecting switch means of the switch arrangement means, in its third

switching position electrically connects the first and second fixed contact of the selecting switch together;

the four further connecting terminal means each being connected to a spatially remotely arranged decoding and control circuit via a multi-core line for transmitting a four-digit binary code with the symbols "no potential" and "potential of the common connecting terminal" to said decoding and control circuit, each adjusting means is addressed in a required adjusting direction by two digits of the binary code from said decoding and control circuit; wherein the first two connecting terminal means connected to the two fixed contacts of the selecting switch means determine which one of the three rear view mirrors is to be adjusted while the third and fourth connecting terminal means connected to the contact bridges of the second and third key switch means determine which directions the mirrors are to be adjusted by said adjusting means; and

wherein the decoding and control circuit operates the adjusting means via control lines in accordance with the binary code therein caused by the lever handle actuating the three key switch means.

4,894,651

BROADBAND SIGNAL SWITCHING EQUIPMENT

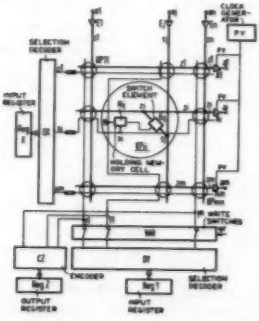
Gerhard Trumpp, Puchheim; Wilhelm Koenig, Munich, and Thomas Lang, Taufkirchen, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jun. 16, 1987, Ser. No. 62,677

Claims priority, application Fed. Rep. of Germany, Jun. 19, 1986, 3620468

Int. Cl.[4] H04Q 9/00

U.S. Cl. 340—825.91 **8 Claims**



1. In a broadband signal switching apparatus having a crosspoint matrix construction using field effect transistor devices, the matrix including a plurality of input lines each having a resistance and extending in one direction, and a plurality of output lines each temrinating in an output terminal extending in another direction and intersecting said input lines to form crosspoints, and in which a plurality of first selection lines extend parallel to said output lines and a plurality of second selection lines extend parallel to said input lines, said selection lines also extending through said crosspoints so that a bit at a potential at a selected input line is conducted via said crosspoint to a selected output line, the improvement comprising:

a plurality of crosspoint switches, each of said crosspoint switches located at a respective crosspoint and having a control electrode, and a controlled path connected between an input line and an output line intersecting at the crosspoint at which said crosspoint switch is located, said controlled path having a high forward resistance in the conducting state in comparison to the resistance of the matrix input line connected thereto;

a plurality of output amplifiers, each of said output amplifiers having an input and an output connected in a respective output line and comprising a network of an inverting complementary metal-oxide-semiconductor logic element, a network switch and a holding element, said holding element having a signal input, a clock input, and an output forming said output of said output amplifier, said logic element having an input forming said input of said output amplifier, a switching threshold and an output connected to said signal input of said holding element, said network switch having a controlled switching path connected between said input of said output amplifier and a reference voltage source, and a control electrode controlling said switching path connected to a clock line and to said clock input of said holding element, said switching path having a low forward resistance in comparison to the resistance of said crosspoint switch for the respective output line; and

means for charging said clock line with a clock signal subdividing a bit switching time interval into a preliminary phase and an actual switching phase, said clock signal rendering said switching path of said network switch conductive during said preliminary phase to reset the respective output line substantially to the potential of the switching threshold of said logic element to prepare said logic element for reloading, proceeding from said potential, by said crosspoint switch during said actual switching phase to a potential corresponding to a bit conducted to the output amplifier by the crosspoint switch respectively connected thereto.

4,894,652

VEHICLE BRAKELIGHTS ACTIVATING DEVICE

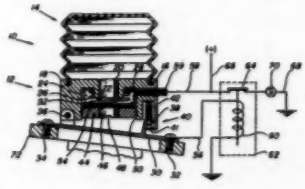
Mordechai Eckstein, Kiron, and Adir Shapira, Moshav Tal-Shahar, both of Israel, assignors to Atat Technology Ltd., Israel

Division of Ser. No. 873,979, Jun. 13, 1986, Pat. No. 4,788,526. This application Oct. 7, 1988, Ser. No. 254,738

Claims priority, application Israel, Oct. 24, 1985, 76813

Int. Cl.[4] B60Q 1/26

U.S. Cl. 340—467 **3 Claims**



1. A signalling device comprising:

a first member;

a second member, the first member being adapted to be affixed to the accelerator pedal of a vehicle and the second member being adapted to be pressed and movable by the accelerator pedal operating foot of a driver;

displaceable mounting means between the first and second members allowing relative movement therebetween;

first and second terminals associated with an electrical circut for operating the brakelights of a vehicle;

the first and second members forming a hollow housing within which there is defined an air chamber having an air inlet opening and a displaceable, lightweight, freely floating conductive metal flap at the vicinity of the air inlet opening, the arrangement being such that during normal, pressed position of the accelerator pedal, the flap is kept at a small distance from the air inlet opening, and upon an abrupt release of the pedal, the flap becomes sucked by a sub-pressure momentarily prevailing within the air cham-

ber, and engages a portion of the air inlet opening thereby making the circuit;

means for making the circuit upon an abrupt relative displacement of the members away one from the other to actuate the circuit; and

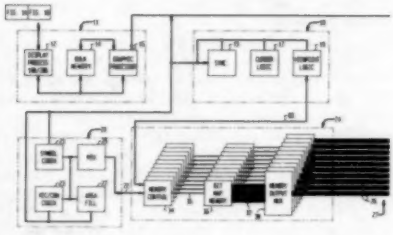
adjusting means for adjusting the effective amount of relative movement for making the circuit.

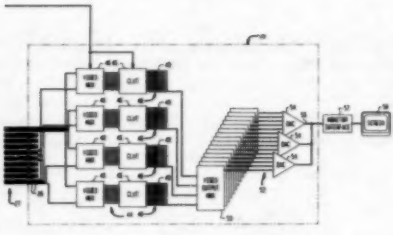
4,894,653

METHOD AND APPARATUS FOR GENERATING VIDEO SIGNALS

David C. Frankenbach, La Habra, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jun. 24, 1988, Ser. No. 211,492
Int. Cl.[4] G09G *1/28*
U.S. Cl. 340—703 **4 Claims**





1. In an apparatus for generation color video signals of the type employing a refresh memory subsystem and a video data subsystem for providing an analog serial bit stream for a display device, the improvement being means for increasing the pixel frequency rate of the analog serial bit stream comprising:

(a) a plurality of bit map memory arrays, the number of bit map memory arrays related to the number of variations of color intensity for each pixel at said display device, each said bit map memory array providing an X-bit parallel data word at a first clock frequency;

(b) a video bus;

(c) a plurality of memory output multiplexers, one of said plurality of memory output multiplexers coupled to receive the X-bit parallel data word at the first clock frequency from a corresponding one of said plurality of bit map memory arrays, each of said memory output multiplexers operating to time-division multiplex each X-bit parallel data word into Y consecutive data words having X/Y parallel bits, said Y consecutive X/Y-bit parallel data words being coupled to said video bus;

(d) X/Y video multiplexers, each of said video multiplexers coupled to said video bus for receiving one of the X/Y bits from each of said X/Y-bit parallel data words at the first clock frequency, the output of said X/Y video multiplexers being a parallel-bit data word containing a color intensity code related to the number of bit map memory arrays;

(e) X/Y color look-up tables, one of said color look-up tables being coupled to one of said X/Y video multiplexers for receiving the color intensity code from said video multiplexers, said color look-up tables providing a multiple-bit color word in response to said color intensity code;

(f) a plurality of video output multiplexers coupled to receive the multiple-bit color word from the color look-up tables, said video output multiplexers performing time-division multiplexing on the multiple-bit color word to provide a plurality of one-bit output words at a final pixel frequency that is X/Y times the first clock frequency; and

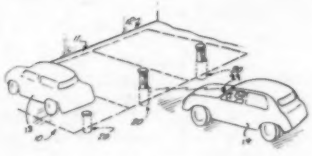
(g) digital to analog converter means for converting the plurality of one bit data words to an analog signal.

4,894,654

METHOD AND APPARATUS FOR RESERVING PARKING SPACES AND/OR SECURITY

George B. Serenbetz, P.O. Box 196, Carnelian Bay, Calif. 95711

Filed Aug. 19, 1988, Ser. No. 233,761
Int. Cl.[4] G08G *1/14*; B60Q *1/48*
U.S. Cl. 340—932.2 **11 Claims**



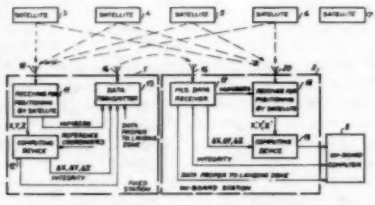
6. An apparatus for securing a parking area from unauthorized use comprising in combination: an opening in the surface of the parking area extending a distance below the surface area; a first activating device anchored to the bottom of said opening in the surface; a second activating device cooperable with, and mounted cooperatively with, said first activating device; a cylinder connected to said first and second activating devices and being mounted within said opening in such manner that the top of said cylinder is flush with the surface of the parking area; power means carried within said cylinder in such manner as to be able to impart movement to said first and second activating devices so as to cause said cylinder to be capable of ascent and descent relative to the surface area.

4,894,655

LANDING ASSISTANCE SYSTEM USING NAVIGATION SATELLITES

Jean C. Joguet, Noisy Le Roy, and Michel Schilliger, Morangis, both of France, assignors to LMT Radioprofessionnelle, Boulogne Billancourt, France

Filed Feb. 26, 1988, Ser. No. 161,099
Claims priority, application France, Feb. 27, 1987, 87 02648
Int. Cl.[4] G01S *1/02*
U.S. Cl. 340—988 **4 Claims**



1. A landing assistance system using navigation satellites,

said system comprising several navigation satellites emitting signals controlled by a clock, a fixed station located in the vicinity of landing strips, said fixed station comprising:

a receiver for positioning by satellite, said receiver giving an estimate of the position of said fixed station, and computing means giving correction data representing the deviation between this estimate and a reference position;

radio transmission means transmitting in a radio channel according to the standards of the microwave landing system known as MLS, to transmit correction data, and landing data associated with each landing strip respectively, including the magnetic alignment, the coordinates of the approach, end of the landing strip and the identity of the landing strip;

said system further comprising a station on-board each aircraft, said on-board station comprising:

a conventional radio receiver to receive data transmitted by a microwave landing system known as MLS;

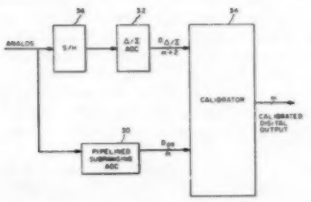
a receiver for positioning by satellite, and computing means that give an estimate of the position of the aircraft, corrected by means of the correction data received by the radio receiver.

4,894,656

SELF-CALIBRATING PIPELINED SUBRANGING ANALOG-TO-DIGITAL CONVERTER

Jyh-Ping Hwang; Wen-Tai Lin, both of Schenectady; Miran Milkovic, Scotia, and Sharbel E. Noujaim, Clifton Park, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Nov. 25, 1988, Ser. No. 275,819
Int. Cl.[4] H03M *1/10*
U.S. Cl. 341—120 **10 Claims**



1. A self-calibrating pipelined subranging analog-to-digital converter comprising:

sample-and-hold means for sampling an analog signal to be converted to a digital output,

a pipeline of elemental stages connected for sampling said analog signal to generate a low-resolution output digital code;

calibration means including memory and arithmetic means addressed by said low-resolution output digital code for storing nonlinearity information and computing a second output digital code based on an interpolation of said low-resolution output digital code with said nonlinearity information; and

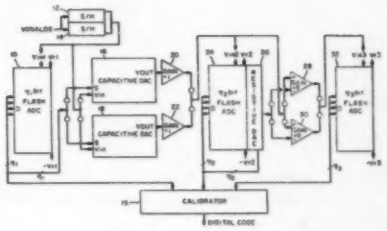
a high-resolution analog-to-digital converter connected to said sample-and-hold means and responsive to samples of said analog signal to generate a high-resolution output digital code, said high resolution output digital code serving as a reference, said calibration means being periodically responsive to said high resolution output digital code for calibrating said memory and arithmetic means.

4,894,657

PIPELINED ANALOG-TO-DIGITAL ARCHITECTURE WITH PARALLEL-AUTOZERO ANALOG SIGNAL PROCESSING

Jyh-Ping Hwang, Schenectady, and Miran Milkovic, Scotia, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Nov. 25, 1988, Ser. No. 275,821
Int. Cl.[4] H03M *1/44*
U.S. Cl. 341—158 **8 Claims**



1. A pipelined analog-to-digital converter with parallel-autozero analog signal processing comprising:

first and second sample-and-hold circuits for alternately sampling and holding an analog voltage signal to be converted to a digital code;

a plurality of stages coupled in series in a pipeline, a first stage of the pipeline being connected to receive output signals from said first and second sample-and-hold circuits and producing a first part of said digital code and a residue voltage, each stage of the pipeline comprising a flash analog-to-digital subconverter, respectively, the subconverter of each of an intermediate and a final stage converting a residue voltage from a preceding stage to a succeeding part of said digital code, each of the first and intermediate stages including parallel circuit paths;

first switching means coupled to said first and second sample-and-hold circuits and to said parallel circuit path in said first stage for alternately connecting one of said first and second sample-and-hold circuits, respectively, and said parallel circuit path of said first stage in a signal path and for autozeroing the sample-and-hold circuit and circuit path not connected in said signal path; and

second switching means coupled to said parallel circuit path in said second stage for alternately connecting said parallel circuit path of said second stage in said signal path;

whereby signal flow at the output of said pipelined analog-to-digital converter is continuous without degradation due to offset voltages.

4,894,658

METHOD OF DATA REDUCTION IN NON-COHERENT SIDE-LOOKING AIRBORNE RADARS

Robert Hecht-Nielsen, Del Mar, Calif., and Laird C. Taylor, Higley, Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Nov. 4, 1983, Ser. No. 548,732
Int. Cl.[4] G01S *13/89*
U.S. Cl. 342—90 **16 Claims**

8. In a side-looking airborne radar of the real aperture type a method of processing and displaying moving target data comprising the steps of:

generating a first image comprising moving target data, said moving target data having been converted to a ground track-true range reference system and having been digitized;

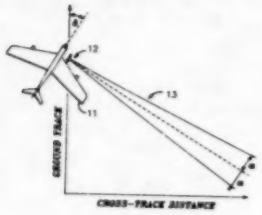
identifying data cells in a current track lane of said first image containing moving target return energy;

determining, with respect to each said identified data cell,

whether said cell represents a new target footprint or a continuation of a previous target footprint;

accumulating, for each target footprint, length and range information;

identifying each target footprint ending in a previous track lane of said first image;



classifying each said ended target footprint as corresponding to one of clutter, an individual target and an extended target; and

generating a second image comprising truncated versions of target footprints corresponding to extended targets and centroids of target footprints corresponding to individual targets.

4,894,659

RADAR ALTIMETER SYSTEMS

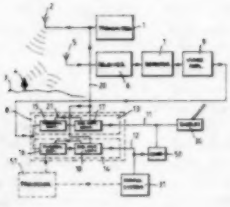
Frank P. Andrews, Easton, England, assignor to Smiths Industries Public Limited Company, London, England

Filed Oct. 4, 1988, Ser. No. 253,029

Claims priority, application United Kingdom, Oct. 7, 1987, 8723566; Nov. 27, 1987, 8727756

Int. Cl.[4] G01S *13/08*

U.S. Cl. 342—121 **15 Claims**



1. An aircraft microwave altimeter system comprising: means for transmitting microwave signals to the ground; means for receiving microwave signal reflected from the ground and objects on the ground; means for deriving from the received signals information as to the height of the aircraft above the ground or objects on the ground; threshold detector means, said threshold detector means being arranged to provide a first set of output signals in accordance with height at a first threshold level, and a second set of output signals in accordance with height at a second threshold level greater than said first threshold level; display means; means supplying said first set of output signals to said display means; navigation means; and means supplying said second set of output signals to said navigation means, such that said navigation means is supplied with signals representative of the height of the aircraft above ground whereas said display means is supplied with signals representative of the height of the aircraft above objects on the ground.

4,894,660

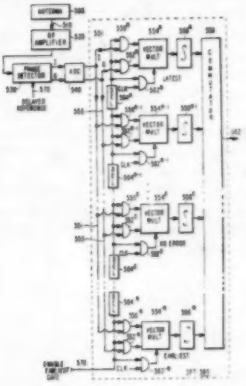
RANGE SIDELOBE REDUCTION BY APERIODIC SWEPT-FREQUENCY SUBPULSES

Don N. Thomson, Haddonfield, and David E. Maron, Marlton, both of N.J., assignors to General Electric Company, Moorestown, N.J.

Filed Oct. 12, 1988, Ser. No. 256,681

Int. Cl.[4] G01S *13/26, 13/30, 13/38*

U.S. Cl. 342—129 **12 Claims**



1. A method for determining the range of a distant target, comprising the steps of:

steering the phase control elements of an array antenna to direct the antenna beam toward the target;

applying a sequence of pulses of carrier to said antenna for transmission, each of said pulses including a plurality of sequential subpulses, each of said subpulses being of carrier of monotonically changing frequency, said plurality of subpulses having nonuniform durations and being separated by nontransmitting periods of constant duration;

estimating the range to said target, and for each of said pulses generating a reference signal comprising at least a part of said plurality of sequential subpulses at a time corresponding to the expected time of return of a reflection from said target;

in the period between said pulses, receiving returned signal from said target and phase detecting said returned signal by use of said reference signal to produce phase detected signals including information relating to the error between the actual range and the estimated range; and

Fourier transforming said phase detected signals to generate range error information.

4,894,661

FISH SCHOOL DETECTING METHOD OR APPARATUS

Kiyotaka Furuno; Hidetoshi Tanigaki, both of Nishinomiya; Kouji Yano, Itami; Tadashi Ozaki, Kobe; Yoshihisa Fukuda, Kawanishi; Takumi Fujikawa, Takarazuka, and Makoto Tanaka, Nishinomiya, all of Japan, assignors to Furuno Electric Company, Limited, Hyogo, Japan

Filed Apr. 21, 1987, Ser. No. 40,797

Claims priority, application Japan, Apr. 23, 1986, 61-94164; Apr. 28, 1986, 61-64918[U]

Int. Cl.[4] G01S *13/06*

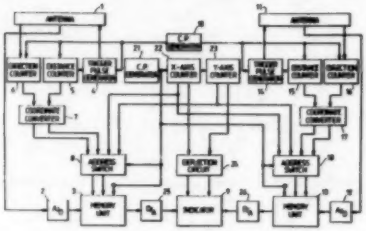
U.S. Cl. 342—140 **18 Claims**

1. A fish school detecting method, comprising:

(i) radiating search signals with their carrier frequency being in the S-band frequency range from an antenna, successively in different azimuthal directions within a wide angular range,

(ii) receiving an echo signal reflected by a bird or birds and indicative of the location of a school of fish,

(iii) processing echo signals received during a plurality of rotations of the antenna so that the echo signals reflected by the bird are emphasized, and



(iv) displaying the resultant processed signals representative of the location of said bird or birds and therefore indicative of the location of said school of fish on the screen of an indicator, thereby locating and detecting the school of fish under the bird or birds.

4,894,662

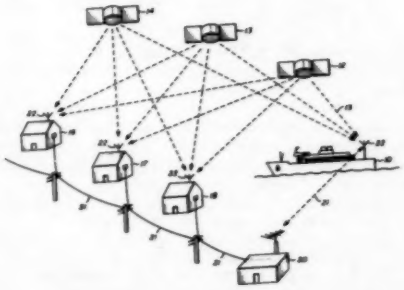
METHOD AND SYSTEM FOR DETERMINING POSITION ON A MOVING PLATFORM, SUCH AS A SHIP, USING SIGNALS FROM GPS SATELLITES

Charles C. Counselman, Belmont, Mass., assignor to Western Atlas International, Inc., Houston, Tex.

Continuation-in-part of Ser. No. 353,331, Mar. 1, 1982, Pat. No. 4,667,203. This application Apr. 14, 1986, Ser. No. 852,016

Int. Cl.[4] G01S *5/02*

U.S. Cl. 342—357 **64 Claims**



1. A method of determining range data from a composite of code modulated, overlapping spread spectrum signals received on a moving platform from a plurality of GPS satellites, comprising the steps of:

developing estimates of the phase and delay of selected signals inherent in the composite;

using the estimates to measure the phase and delay of the selected signals;

updating the estimates in response to the measurements to derive phase and delay observations; and

time averaging the observations to derive instantaneous platform range data.

4,894,663

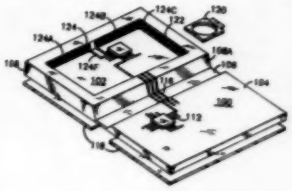
ULTRA THIN RADIO HOUSING WITH INTEGRAL ANTENNA

Glenn F. Urbish, Coral Springs; Quirino Balzano, Plantation; Dale W. Dorinski, Coral Springs; Martin J. McKinley; Leng H. Ooi, both of Sunrise; John A. Stoutland, Margate, and Anthony B. Suppelsa, Coral Springs, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Nov. 16, 1987, Ser. No. 121,322

Int. Cl.[4] H01Q *1/24*

U.S. Cl. 343—702 **13 Claims**



1. An ultra-thin radio housing integral antenna, comprising in combination:

a thin base having upper and lower surfaces and including a peripheral wall attached to said upper surface and extending substantially around the perimeter of said base, the peripheral wall includes a portion sloped at an acute angle relative to the base; and

a loop antenna disposed at least partially on said peripheral wall sloped section of said base.

4,894,664

MONOLITHIC THERMAL INK JET PRINTHEAD WITH INTEGRAL NOZZLE AND INK FEED

Alfred I. Tsung Pan, Mountain View, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Continuation-in-part of Ser. No. 856,740, Apr. 28, 1986, abandoned. This application Nov. 25, 1987, Ser. No. 125,433

Int. Cl.[4] G01D *15/8*; B41J *30/4*

U.S. Cl. 346—1.1 **5 Claims**

1. A process for increasing the lifetime of a resistive heater element in a thermal ink jet printhead of the type having an orifice plate mounted on a thin film substrate, including the steps of:

a. providing a flexible suspended beam containing a resistive heater element in an ink reservoir of said thin film substrate and extending from one side of said reservoir to another, and

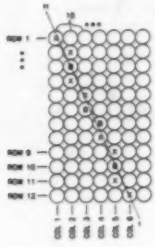
b. providing electrical connections into said resistive heater element, whereby the utilization of said suspended beam in the ink within said reservoir allows the ink to cool said heater element and to absorb cavitational forces produced by ink ejected from said orifice plate and thereby increase printhead lifetime.

4,894,665

METHOD OF GENERATING AN EXPANDED COLOR SET OF A LOW RESOLUTION COLOR PRINTER

Randall L. Davis, Phoenix, Ariz., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Apr. 20, 1989, Ser. No. 340,839
Int. Cl.[4] G01D *9/00*; G03F *3/08*
U.S. Cl. 346—1.1 **18 Claims**



1. In a low resolution color printer which prints a pattern by printing selected pixels, said printer having a predetermined number of colors thereby making a color set of said printer, said printer also having a color black, a method of generating shaded colors thereby expanding the color set of said printer, said method comprising the steps of:

(a) determining if a critical line is to be printed;

(b) determining if the shaded color is to be printed;

(c) if a shaded pattern (any pattern but a critical line) is to be printed utilizing one of said predetermined colors, generating a print buffer in accordance with a first algorithm;

(d) if a critical line having the shaded color is to be printed, generating a print buffer in accordance with a second algorithm; and

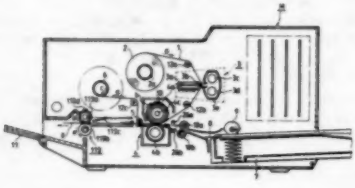
(e) otherwise, generating a print buffer using the designated color.

4,894,666

IMAGE RECORDING METHOD AND APPARATUS

Noriyoshi Ishikawa, Yokohama; Toshiaki Harada, Kawasaki; Toshiharu Inui, Yokohama; Tadashi Yamamoto, Kawasaki; Kazuhiro Nakajima, and Masanori Takenouchi, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 19, 1988, Ser. No. 259,896
Claims priority, application Japan, Oct. 22, 1987, 62-265423; Jun. 13, 1988, 63-143683
Int. Cl.[4] G01D *15/10*
U.S. Cl. 346—76 PH **23 Claims**



1. An image recording apparatus having:

conveying means for conveying a transfer recording medium having a transfer recording layer whose transfer characteristic is varied upon application of first energy and second energy differing from said first energy;

a recording section having first energy imparting means for imparting said first energy to said transfer recording medium and second energy imparting means for imparting said second energy to said transfer recording medium provided along the conveyance route of said transfer recording medium conveyed by said conveying means;

a transfer section for transferring an image formed on said transfer recording medium in said recording section to a recording medium; and

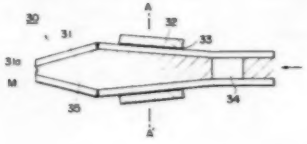
applying means for applying predetermined heat energy and a shearing force to said recording medium to which the image has been transferred in said transfer section.

4,894,667

INK JET RECORDING HEAD HAVING A SURFACE INCLINED TOWARD THE NOZZLE FOR ACTING ON THE INK

Jiro Moriyama, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 2, 1987, Ser. No. 9,873
Claims priority, application Japan, Feb. 5, 1986, 61-22054
Int. Cl.[4] G01D *15/16*
U.S. Cl. 346—140 R **12 Claims**



1. An ink jet recording head comprising:

a member forming an ink flow path communicating with an opening for discharging ink therefrom; and

an electro-mechanical converting element provided along said ink flow path at an ink acting surface inclined with respect to an ink flow direction so as to increase the sectional area of said ink flow path toward said ink discharging opening,

wherein a thickness of said member at said ink acting surface is substantially constant.

4,894,668

RECORDER HAVING MEANS FOR SUPPORTING THE ENTIRE WIDTH OF A CONTINUOUS RECORDING MEDIUM

Masa K. Ozawa, Ebina; Kunitaka Ozawa, Isehara; Katsunori Hatanaka, Yokohama; Tetsuo Suzuki, Hiratsuka; Tetsuzo Mori, Hirtsuka; Tadashi Shiina, Hiratsuka, and Ryuichi Ebinuma, Atsugi, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 3,052, Jan. 13, 1987, abandoned, which is a division of Ser. No. 733,389, May 13, 1985, Pat. No. 4,651,173. This application Nov. 28, 1988, Ser. No. 277,522
Claims priority, application Japan, May 19, 1984, 59-101508; May 19, 1984, 59-101509; May 19, 1984, 59-101510; May 19, 1984, 59-101511; May 19, 1984, 59-101512
Int. Cl.[4] G01D *15/28*; B41J *30/4*
U.S. Cl. 346—136 **7 Claims**

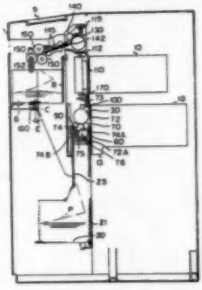
1. An ink jet recorder for recording on a continuous form recording medium, the recorder comprising:

a feed roller for feeding the recording medium past recording means, wherein said feed roller is disposed above an accommodation position at which the recording medium is accommodated when the recorder is in an operating position;

a press roller for pressing the recording medium against said feed roller at a pinch position upstream of the recording means in the path of the recording medium; and

de-skew support means for supporting the weight of the

recording medium across the entire width thereof between the accommodation position and the pinch position, wherein said de-skew support means is disposed adjacent



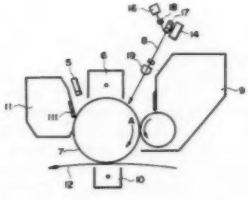
to said feed roller so as to cause the recording medium to contact the periphery of said feed roller for a predetermined wrapping angle before reaching the pinch position.

4,894,669

LASER BEAM PRINTER

Yoshinori Sugiura, Kawasaki, and Akihiko Takeuchi, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 18, 1989, Ser. No. 339,695
Claims priority, application Japan, Apr. 20, 1988, 63-097533
Int. Cl.[4] G01D *15/00*
U.S. Cl. 346—160 **24 Claims**



1. A laser beam printer, comprising:

laser beam producing means for producing a laser beam modulated in accordance with image information;

deflecting means for deflecting the laser beam produced by said laser beam producing means to effect a scanning operation, said deflecting means is rotatable to deflect the laser beam;

a rotatable photosensitive member for being exposed to the laser beam deflected by said deflecting means;

control means for controlling said deflecting means and for controlling rotation of said photosensitive member; and

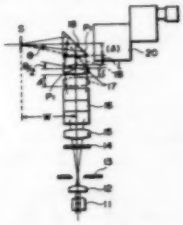
wherein upon printing signal, said control means causes said deflecting means to start its rotation, and thereafter, causes said photosensitive member to start its rotation.

4,894,670

SLIT PROJECTION APPARATUS

Takashi Masuda, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 19, 1988, Ser. No. 145,408
Claims priority, application Japan, Jan. 26, 1987, 62-15753
Int. Cl.[4] A61B *3/10*
U.S. Cl. 351—214 **13 Claims**



1. A slit projection apparatus comprising:

slit light beam forming means;

a projection optical system for projecting a slit image onto an object to be examined in at least first and second elevation angles, said projection optical system including means for maintaining the slit and the object conjugate to each other when projecting the slit image in the first and second elevation angles, said projection optical system being provided with a light deflecting member which is movable in the direction of the optical axis of said projection optical system and is rotatable for generating the at least first and second elevation angles and at least a lens which is movable with said light deflecting member in the direction of the optical axis of said projection optical system in accordance with changes in the elevation angle; and

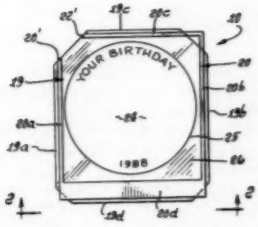
means for moving said light deflecting member and said lens in a body in the direction of the optical axis.

4,894,671

FILM PACK SUPPORT OF IMAGE-BEARING TEMPLATE

Alton D. Wheeler, 3940 Fox Meadow La., Pasadena, Tex. 77504

Filed Nov. 7, 1988, Ser. No. 267,830
Int. Cl.[4] G03B *17/24*
U.S. Cl. 354—108 **12 Claims**



1. A device for use in a camera in conjunction with exposure of a photographic film carried by carrier structure including a frame bounding a light passing zone, and comprising

(a) a template in the form of a locally transparent, generally planar and rectangular sheet adapted to carry an image to be reproduced on the film,

(b) there being multiple elongated ribs integral with said sheet, and projecting outwardly from the plane of the sheet,

(c) said multiple ribs substantially bounding all of said light passing zone to block light access to said zone in directions parallel to the plane of the sheet,

(d) said ribs including a first laterally elongated rib at one end of the template to engage the frame adjacent said one end of the template to prevent removal of the template in response to endwise removal of exposed film from the carrier structure, whereby the template sheet remains in the path of light transmission in directions generally normal to the plane of the sheet and to unexposed film carried by the carrier structure.

4,894,672

CAMERA HAVING FOCAL LENGTH ADJUSTING LENS

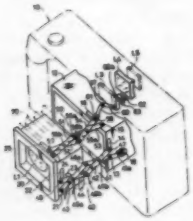
Hitoshi Tanaka, Tokyo, Japan, assignor to Asahi Kogaku Kogyo K.K., Tokyo, Japan

Filed Dec. 16, 1988, Ser. No. 285,066

Claims priority, application Japan, Dec. 18, 1987, 62-320838

Int. Cl.[4] G03B 3/10

U.S. Cl. 354—195.12 **22 Claims**



1. A camera having a focus adjusting lens assembly, comprising a camera body, a lens barrel which can move in the optical axis direction with respect to the camera body, a first variable power lens group which is supported to move in the optical axis direction with respect to the lens barrel, a second variable power lens group integrally connected to the lens barrel so as to move therewith, a deformable link mechanism which movably connects the camera body and the lens barrel so as to vary distance therebetween, and means for moving the first power lens group to a predetermined position in the lens barrel in accordance with the deformation of the link mechanism.

4,894,673

FILM CASSETTE

David E. Beach, Stowe, Vt., assignor to Eastman Kodak Company, Rochester, N.Y.

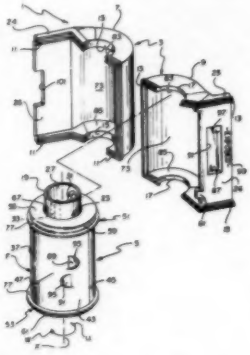
Filed Jan. 12, 1989, Ser. No. 296,466

Int. Cl.[4] G03B 17/26

U.S. Cl. 354—275 **2 Claims**

1. An improved film cassette wherein (a) respective throat portions define a film passage slit to the outside of the cassette shell, (b) a normally unexposed filmstrip has a film leader originally located within said film passage slit, and (c) a film spool is rotatable in a winding direction to wind said film leader from said film passage slit further into said cassette shell after said filmstrip is completely exposed, and wherein the improvement comprises:

exposure-completed indicator means positioned within said film passage slit to be normally covered by said filmstrip, and to be uncovered by the filmstrip only when said film leader is further wound into said cassette shell in response to rotation of said film spool in the winding direction; and window means defining an opening in one of said throat portions for permitting said exposure-completed indicator



means to be viewed when it is not covered by said filmstrip.

4,894,674

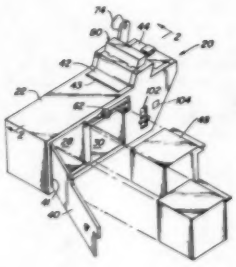
DAYLIGHT BULK FILM LOADING SYSTEM

Mitchell C. Radov, 631 Montroyale Dr. E., Erie, Pa. 16504

Filed Sep. 22, 1988, Ser. No. 247,627

Int. Cl.[4] G03B 17/26

U.S. Cl. 354—275 **42 Claims**



1. Apparatus for daylight loading bulk photosensitive film of different format sizes on a camera film feed spool, the film being supplied in bulk form from a rolled strip within a rectangular cartridge and dispensable through a slot in one side of the cartridge, comprising, in combination:

a casing partitioned by a divider to form a film compartment and a loading compartment, said film compartment being formed of interface slidably with the cartridge, said loading compartment being formed to support axially the spool, and a passageway in said divider at the cartridge slot for admitting the film into said loading compartment;

drive means rotatably mounted in said casing and extending into said loading compartment for removably coupling to the spool and winding the film thereon;

selector means mounted on said casing for producing an output indicative of a manually selected format size for loading on the spool; and

computer means operatively connected to said drive means and said selector means for multiplying the number of revolutions of said drive means by the selector means output and producing an output indicative of the product

thereof and of the number of frames of the selected size wound on said spool.

4,894,675

APPARATUS FOR SPLICING TOGETHER UNDEVELOPED CUSTOMER FILMS IN A DARKROOM

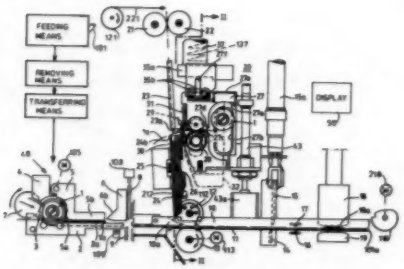
Reinhart Würfe, Munich; Helmut Zangenfeind, Puchheim, and Rainer Türcke, Taufkirchen, all of Fed. Rep. of Germany, assignors to AGFA-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Oct. 28, 1988, Ser. No. 264,806

Claims priority, application Fed. Rep. of Germany, Nov. 6, 1987, 3737801

Int. Cl.[4] G03D *13/06*

U.S. Cl. 354—308 **33 Claims**



1. Apparatus for converting undeveloped photographic roll films which are convoluted on reels into a continuous web of coherent films, comprising a darkroom; first and second film unwinding units in the interior of said darkroom; web collecting means in said darkroom; means defining in said darkroom a first film channel extending from said first unit toward said collecting means; means for splicing together successive films in said channel end-to-end so as to convert such films into a web; and means defining a second film channel extending from said second unit to a portion of said first channel between said splicing means and said first unit, said darkroom having at least one normally sealed inlet for affording access to said units by at least one hand for manual transfer of reels from said first unit into said second unit and, if necessary, for threading the film on a transferred reel into said second channel.

4,894,676

AUTOMATIC FOCUSING DEVICE FOR CAMERA

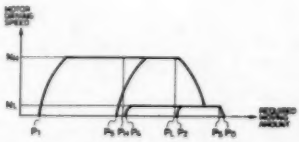
Ichiro Ohnuki, and Shinichi Matsuyama, both of Tokyo, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 31, 1987, Ser. No. 140,100

Claims priority, application Japan, Jan. 12, 1987, 62-004593

Int. Cl.[4] G03B *3/10*

U.S. Cl. 354—400 **11 Claims**



1. An automatic focusing device for moving a photographing optical system to a in-focus position by a driving motor, comprising:

(a) first control means for driving said motor at a high speed, when said photographing optical system is distanced in excess of a first amount from said in-focus position, thereby moving said photographing optical system to said in-focus position with a high speed, said first control means being further adapted to change said motor to a low driving speed when said photographing optical system reaches a position distanced from said focused position by a predetermined amount;

(b) second control means for driving said motor at a low speed, when said photographing optical system is distanced less than a second amount from said in-focus position, thereby moving said photographing optical system to said in-focus position with a low speed; and

(c) third control means for prohibiting said high-speed driving even when said photographing optical system is distanced in excess of said first amount from said in-focus position, if said motor, upon reaching a predetermined high speed after the start of the high-speed drive, cannot be maintained at said predetermined high speed for a predetermined period.

4,894,677

HIGH-POWER ILLUMINATION DEVICE FOR A CAMERA

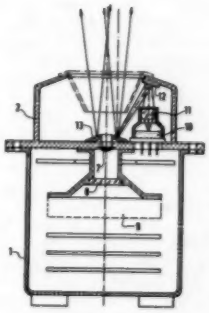
Henri Bourcier, Marolles en Brie, and Pierre Turon Lacarrieu, Segny, both of France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 8, 1988, Ser. No. 281,574

Claims priority, application France, Dec. 18, 1987, 87 17714

Int. Cl.[4] G03B *3/00*; **G02B** *13/16*; **H04N** *5/225, 5/30*

U.S. Cl. 354—403 **4 Claims**



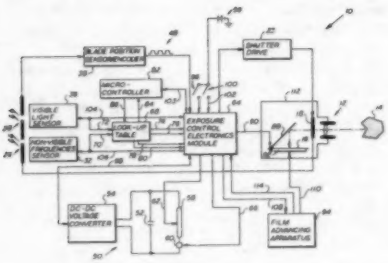
1. A high-power illumination device integrated with a camera for measuring the direction, distance and/or attitude of two objects relative to each other, whilst one of said objects carries the device, which camera images the other object on a detector via an input-optical system, said device comprising a plurality of elementary sources each associated with an optical system for adjusting the field of view of each source to that of the input-optical system of the camera, characterized in that said elementary sources are regularly spaced in a ring configuration around the pupil of said input-optical system, the light beam from the optical system of each source being focused via a deflecting mirror arranged opposite each source onto a facet mirror surrounding the pupil of the input-optical system and comprising as many facets as there are light sources, each facet being inclined so as to align the direction of the reflected beam with the direction of the field of view of the camera in such a way that the light beams from the said mirror facets are quasi-superimposed all around the optical axis of the camera.

4,894,678

PREFLASH PSEUDOFOCUS/EXPOSURE CONTROL SYSTEM

David L. Farrington, Boxborough; Norman D. Staller, Beverly, and George D. Whiteside, Lexington, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed May 1, 1989, Ser. No. 345,959
Int. Cl.[4] G03B 15/05
U.S. Cl. 354—415 12 Claims



1. A camera for forming a photographic image of optimum sharpness and overall scene exposure having means for defining a film plane comprising:

a fixed focus lens for directing image-carrying light rays along an optical path from a scene onto photosensitive material located in the film plane;

a blade mechanism mounted for movement between a blocking arrangement in which said blade mechanism is in light blocking relation with respect to the optical path so as to preclude scene light from being transmitted along the optical path to the film plane and an unblocking arrangement in which said blade mechanism is in light unblocking relation with respect to the optical path so as to allow the passage of scene light to the film plane through an exposure aperture, said blade mechanism serving to provide an exposure aperture whose size varies in a predetermined manner when said blade mechanism is actuated between its said light blocking and unblocking arrangements to produce an exposure interval;

a source of artificial light for directing visible and non-visible electromagnetic frequencies toward the scene;

means for sensing ambient scene light before or at the early stages of and during an exposure interval and for generating signals representative thereof;

means for sensing non-visible electromagnetic frequencies reflected from a scene subject before or at the early stages of and during an exposure interval and for generating signal representative thereof;

means responsive to the said ambient scene light signal and the said non-visible electromagnetic frequencies signal generated prior to or at the early stages of an exposure interval for generating a signal representative of a minimum blade mechanism exposure aperture size at which said source of artificial light is to be actuated to illuminate the scene during an exposure interval; and

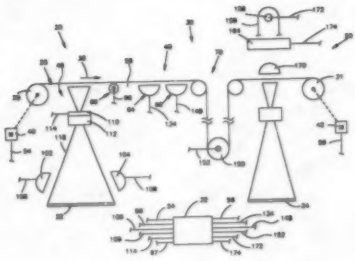
control means for (1) actuating said light source to direct a first pulse of light containing at least said non-visible electromagnetic frequencies toward a subject in a scene before or at the early stages of an exposure interval, (2) for actuating said light source to direct a second pulse of light containing both of said visible and non-visible electromagnetic frequencies toward the scene in correspondence with said exposure aperture size signal and the said non-visible electromagnetic frequencies signal generated during the exposure interval, and (3) for actuating said blade mechanism to generate the exposure interval in correspondence with the said ambient scene light signal generated during the exposure interval to thereby form a photographic image of optimum sharpness and overall scene exposure.

4,894,679

METHOD AND APPARATUS FOR USE IN TRANSFERRING AN IMAGE

Ervin J. Rachwal, Sarasota; George deClaire, Bradenton, and Frederick J. Elia, Sarasota, all of Fla., assignors to Graphics LX Corp., Sarasota, Fla.

Filed Jun. 3, 1988, Ser. No. 202,794
Int. Cl.[4] G03G 15/00
U.S. Cl. 355—18 71 Claims



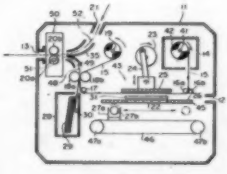
51. An apparatus comprising a linear array of stations, means for moving a carrier along a path extending through each station of the linear array of stations, means for forming an intermediate image on the carrier at the image forming station, means for transferring an enlargement of the intermediate image on the carrier to photosensitive material at the transfer station, said means for transferring an enlargement of the intermediate image to the photosensitive material including means for transmitting radiant energy through the carrier onto a surface of the photosensitive material with an energy level of at least 500 ergs per square centimeter at the surface of the photosensitive material.

4,894,680

IMAGE RECORDING APPARATUS

Kiyoharu Hayakawa, Ama; Yumio Matsumoto, Kasugai; Masashi Ueda, Nagoya; Akira Sago, Nagoya, and Osamu Takagi, Nagoya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Japan

Filed Jun. 6, 1988, Ser. No. 203,318
Claims priority, application Japan, Jun. 8, 1987, 62-88462; Jun. 12, 1987, 62-91191; Jun. 15, 1987, 62-91497; Dec. 15, 1987, 62-191009
Int. Cl.[4] G03B 27/32, 27/52
U.S. Cl. 355—27 58 Claims



1. An image recording apparatus utilizing a developing sheet, which comprises:

a housing provided in its wall with an external insertion opening;

a pair of heat-treatment rollers arranged within said housing,

said pair of heat-treatment rollers defining therebetween a nip;

means for defining a first predetermined transport paths which extends through the nip between said pair of heat-treatment rollers, said developing sheet having carried thereon an image being transported along said first predetermined transport path, wherein said developing sheet is caused to pass through the nip between said pair of heat-treatment rollers and is heat-treated thereby so that the image on said developing sheet is fixed and recorded onto said developing sheet;

means for defining a second predetermined transport path extending through the nip between said pair of heat-treatment rollers, said second predetermined transport path being different from said first predetermined transport path and extending from said external insertion opening, wherein an article inserted through said external insertion opening can travel along said second predetermined transport path so that the article is caused to pass through the nip between said pair of heat-treatment rollers and is heat-treated thereby.

4,894,681

IMAGE READER

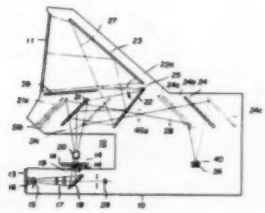
Yutaka Watanabe; Hideaki Kusano, and Masaaki Ito, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 194,921, May 17, 1988, abandoned. This application Jun. 22, 1989, Ser. No. 370,156

Claims priority, application Japan, May 21, 1987, 62-125343; Sep. 30, 1987, 62-244250

Int. Cl.[4] G03B *13/28, 27/80, 23/08*

U.S. Cl. 355—45 **20 Claims**



15. An image reader for reading an image from a microfilm having images recorded thereon, which image reader comprises:

a light source for illuminating said images recorded on said microfilm;

a screen for said image to be projected as magnified thereon;

projecting means for projecting an optical image of the microfilm on said screen;

scanning means for scanning the optical image of the microfilm, which includes photoelectric transferring means for emitting electric signals in response to the amount of light impinging thereon; and

beam attenuating means disposed in front of said photoelectric transferring means and adapted to attenuate the luminous energy of the light emitted from said light source and exposed on said photoelectric transferring means.

4,894,682

VARIABLE MAGNIFICATION COPYING APPARATUS

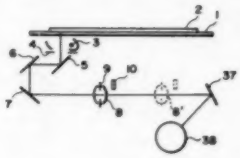
Kazuyuki Kondo, Kawasaki; Jun Koide, Yokohama; Kanji Yano, Kawasaki; Makoto Tanaka, Tokyo, and Haruo Tsunoi, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 24, 1987, Ser. No. 100,453

Claims priority, application Japan, Sep. 30, 1986, 61-232769; Nov. 13, 1986, 61-174640

Int. Cl.[4] G03B *27/52, 27/71*

U.S. Cl. 355—55 **30 Claims**



1. A variable magnification exposure apparatus, comprising:

a light-receiving member;

a light source for illuminating an original;

projecting means for projecting through a slit an image of an original illuminated by said light source on said light-receiving member, said projecting means including lens means movable in accordance with a magnification of projection selected;

a correcting member, disposed in a fixed positional relation to said lens means, for correcting non-uniformity of exposure of said light-receiving member to the projected image along a longitudinal direction of the slit; and

an aperture stop member movable in a direction substantially perpendicular to an optical axis of said lens in accordance with the magnification selected;

wherein, by movement of said aperture stop member, the relative position between said correcting member and the light rays that pass through said lens means, is maintained with high precision.

4,894,683

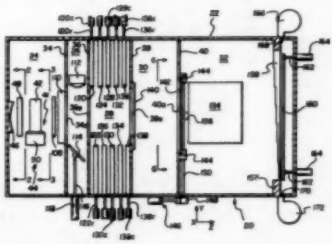
VARIABLE BRIGHTNESS LIGHT GENERATORS

Kevin P. McGuire, Rochester, and James D. McKay, Penfield, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 5, 1988, Ser. No. 279,623

Int. Cl.[4] G03B *27/72*

U.S. Cl. 355—71 **7 Claims**



1. A variable brightness light generator, including:

a spherical mirror;

a lamp located at the center of the spherical form of said mirror; and

a modulator located between the lamp and the mirror for

modulating the brightness of the image of the bulb on the bulb.

4,894,684

IMAGE FORMING APPARATUS WITH DEVELOPING DEVICE ACCOMMODATING APPARATUS

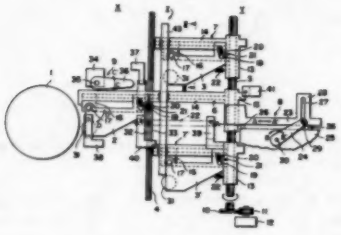
Hisao Nakajima, Kawasaki, and Ken Tanabe, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 9, 1988, Ser. No. 166,004

Claims priority, application Japan, Mar. 10, 1987, 62-052916; Mar. 10, 1987, 62-052919

Int. Cl.[4] G03L *15/01*

U.S. Cl. 355—207 **8 Claims**



1. An image forming apparatus, comprising:

a main assembly having a developing position, an opening for receiving and delivering a developing device and a developing device transportation passage extending between the developing position and the opening;

developing device accommodating means for accommodating a plurality of developing devices and for supplying them to the opening;

detecting means for detecting a malfunction of an image forming operation; and

means for transporting a selected one of said developing devices to said developing device accommodating means in response to detection by said detecting means.

4,894,685

MULTICOLOR IMAGE FORMING METHOD AND APPARATUS

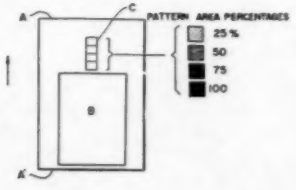
Hisashi Shoji, Hachioji, Japan, assignor to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Oct. 6, 1987, Ser. No. 106,856

Claims priority, application Japan, Oct. 7, 1986, 61-239739; Oct. 7, 1986, 61-240739

Int. Cl.[4] G03G *15/04, 15/08*

U.S. Cl. 355—246 **16 Claims**



1. A multicolor image forming method comprising the steps of:

forming a multicolor toner image on an image retainer by a plurality of developing means; and

transferring said multicolor toner image to a transfer material,

wherein the improvement comprises:

forming a reference toner image on a non-transfer portion of said image retainer by any of said developing means; said reference toner image being a pattern having a predetermined recording area percentage.

reading out the reflective density of said reference toner image; and

setting image forming conditions in accordance with the reflective density read out.

4,894,686

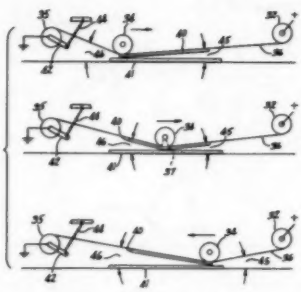
TRANSFER ROLLER

David P. Bujese, 14 Stony Hill Rd., Butler, N.J. 07405

Continuation-in-part of Ser. No. 91,617, Aug. 31, 1987, Pat. No. 4,763,157. This application Jul. 29, 1988, Ser. No. 224,963

Int. Cl.[4] G03G *15/168*

U.S. Cl. 355—271 **21 Claims**



21. Apparatus for the electrostatic transfer of a developed image from an electrostatically developable surface supported by carrier means to an electrically chargeable receiving surface, the improvement comprising in combination:

(a) transfer means contactable with the carrier means to move the electrostatically developable surface adjacent to, but not in contact with the receiving surface to effect the electrostatic transfer of the developed image, the transfer means being reversible and traversing the carrier means a distance equal to at least the length of the electrostatically developable surface;

(b) tensioning means for tensioning the carrier means causing the carrier means to form a trailing angle with the receiving surface as the transfer means traverses the carrier means during the electrostatic transfer; and

(c) retention means for retaining the carrier means and positioned such that the transfer means is intermediate the tensioning means and the retention means causing the carrier means to form a leading angle with the receiving surface as the transfer means traverses the carrier means during the electrostatic transfer.

4,894,687

PRESSURE TRANSFIXING OF TONER IMAGES USING SKEWED ROLLERS

Leo A. Beaudet, Milford, Mass., assignor to Dennison Manufacturing Company, Framingham, Mass.

Continuation of Ser. No. 426,466, Sep. 29, 1982, abandoned, which is a continuation-in-part of Ser. No. 180,218, Aug. 21, 1980, abandoned. This application Sep. 30, 1988, Ser. No. 252,089

Int. Cl.[4] G03G *15/14*

U.S. Cl. 355—277 **16 Claims**

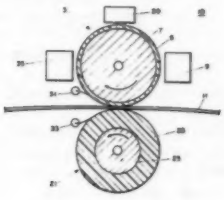
1. Apparatus for forming an image on a receptor sheet, comprising:

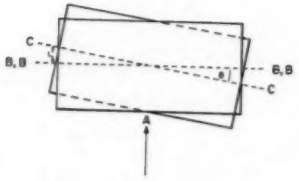
an image roller with a hard, smooth surface with a finish that is better than 20 microinch RMS;

means for forming a toner image on said image roller; and

a transfer roller in rolling contact under high pressure with the image roller, including a surface material selected from the class consisting of engineering thermoplastic and engineering thermoset materials,

said transfer roller having a non-parallel axial orientation and an angle of skew of between 0.5 and 1.5 degrees with respect to said image roller.





wherein the toner image is transferred from the image roller and simultaneously fused to a receptor sheet which is fed through a nip between said image roller and said transfer roller, and wherein said receptor sheet adheres to the surface of said transfer roller at the nip in preference to the surface of the image roller, causing a surface motion differential between the receptor sheet and the image roller at said nip.

4,894,688

DEVICE FOR CIRCULATING DEVELOPER

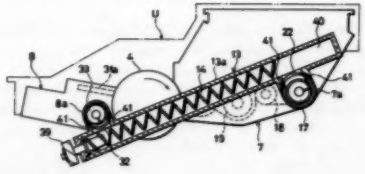
Masami Taniguchi, and Junichi Takamatsu, both of Osaka, Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan

Filed Feb. 29, 1988, Ser. No. 161,646

Claims priority, application Japan, Mar. 3, 1987, 62-49603; Mar. 3, 1987, 62-49604; Mar. 3, 1987, 62-49605; Mar. 3, 1987, 62-49608; Mar. 3, 1987, 62-49609

Int. Cl.[4] G03G *15/08*

U.S. Cl. 355—298 **32 Claims**



1. A device for use with an image forming apparatus having a photosensitive drum and a developing device and a cleaning device disposed around said photosensitive drum for conducting developer recovered in said cleaning device to said developing device comprising:

a circulating passage means provided between said developing device and said cleaning device so as to communicate said developing device with said cleaning device;

discharging means for discharging developer recovered in said cleaning device to said circulating passage means;

conveying means disposed in said circulating passage means for conveying developer in said circulating passage means to said developing device, said conveying means and said circulating passage means being constructed to provide a space between said conveying means and said circulating passage means such that a portion of the developer is allowed to be temporarily retained in said space; and

supplying means for supplying developer conveyed by said conveying means into said developing device.

4,894,689

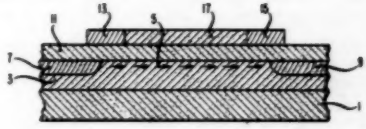
TRANSFERRED ELECTRON DEVICE

James A. Cooper, Jr., West Lafayette, Ind., and Karvel K. Thornber, Berkeley Heights, N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 28, 1984, Ser. No. 687,127

Int. Cl.[4] H01L *27/26, 47/00, 47/02*

U.S. Cl. 357—3 **11 Claims**



1. A microwave device comprising

a semiconductor region, said region having a regime of negative differential mobility;

a source of carriers in said region;

a drain electrode to said region, a channel in said region between said source and said drain electrode;

an electrically conducting region separated from said channel; and

first and second electrodes to said electrically conducting region, at least two of said electrodes biasing said semiconductor region into said regime of negative differential mobility.

4,894,690

THIN FILM TRANSISTOR ARRAY INCORPORATING A SHORTED CIRCUIT BYPASS TECHNIQUE

Kazuya Okabe, Moriya; Hideyuki Matsuda, Iwaki; Yasuhiko Kasama, Izumi, and Hiroyuki Hebiguchi, Sendai, all of Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan

Filed Mar. 25, 1988, Ser. No. 173,751

Claims priority, application Japan, Apr. 22, 1987, 62-99175

Int. Cl.[4] H01L *27/10, 29/44*

U.S. Cl. 357—4 **2 Claims**

1. A thin film transistor array comprising:

a substrate;

a first plurality of buses disposed on the substrate;

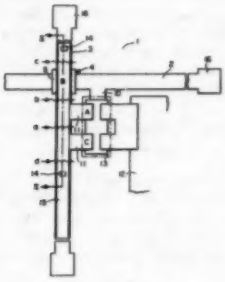
a second plurality of buses disposed on the substrate and intersecting said first plurality of buses at cross over points;

a plurality of thin film transistors grouped in pairs, each transistor of the pair being parallel to point and connected to a bus of said first plurality thereof and a bus of said second plurality thereof for driving a liquid crystal display;

a bypass bus disposed along a bus of said first and second pluralities thereof;

a passivation layer disposed between said bypass bus and said bus of said first and second pluralities thereof, the

bypass bus contacting said bus of said first and second pluralities thereof through contact holes, wherein said contact holes are defined through said passivation layer at predetermined locations, whereby in the event of an electrical short developing in the contacted bus between said contact holes, a portion of said contacted bus between said contact holes may be severed, with the bypass bus providing connection to the remaining portions of said contacted bus through said contact holes.

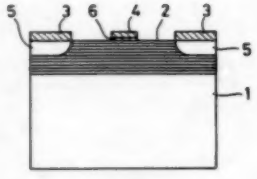


4,894,691

COMPOUND SEMICONDUCTOR DEVICE WITH SUPERLATTICE CHANNEL REGION

Yuichi Matsui, Osaka, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Apr. 24, 1987, Ser. No. 42,330
Claims priority, application Japan, Apr. 30, 1986, 61-99928
Int. Cl.[4] H01L *29/205, 29/80*
U.S. Cl. 357—22 **15 Claims**



1. A compound semiconductor device incorporating a channel layer coupled to a source electrode and a drain electrode and which is made of periodically layering compound semiconductor thin-film layers substantially being different from each other comprising;

a first type of said compound semiconductor thin-film layers having a specific energy difference between conduction band and valence band being less than that of a second type of said compound semiconductor thin-film layers, a specific electron mobility which is greater than that of the second type of said compound semiconductor thin-film layers in low electric field application, a specific electron mobility which is less than that of the second type of the compound semiconductor thin-film layers in high electric field applicatson, and causes impact ionization of valence electrons to occur at lower electric field application than the second type of said compound semiconductor thin-film layers; and

the second type of said compound semiconductor thin-film layers having a specific energy difference between conduction band and valence band being more than that of said first type of said compound semiconductor thin-film layers, a specific electron mobility which is greater than that of said first type of said compound semiconductor thin-film layers in high electric field application, allows conduction electrons to preferentially flow through said first type of said compound semiconductor thin-film layers in low electric field application and also conduction electrons highly energized by acceleration to preferentially flow through said second type of said compound semiconductor thin-film layers in high electric field application, and also allows conduction electrons highly energized by acceleration in high electric field application to move from said first type of said compound semiconductor thin-film layers to the second type of said compound semiconductor thin-film layers before said conduction electrons cause impact ionization of valence electrons and inter-valley scattering to occur in said conduction band inside of said first type of said compound semiconductor thin-film layers;

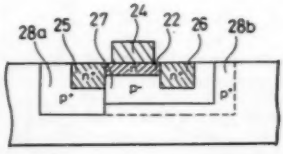
wherein said first type of said compound semiconductor thin-film layers are substantially composed of either InAs or InSb compound semiconductor, whereas the second type of said compound semiconductor thin-film layers are substantially composed of InP compound semiconductor.

4,894,692

MESFET WITH ALPHA PARTICLE PROTECTION

Minoru Noda, and Noriyuki Tanino, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Jun. 2, 1988, Ser. No. 203,295
Claims priority, application Japan, Jun. 3, 1987, 62-139171
Int. Cl.[4] H01L *27/02*
U.S. Cl. 357—23.2 **7 Claims**



1. An integrated circuit comprising:

a semi-insulating semiconductor substrate having a surface;

a first conductivity type embedded region disposed in said semi-insulating substrate;

second conductivity type drain and source regions disposed in and at the surface of said semi-insulating substrate;

a gate electrode disposed on the surface of said semi-insulating substrate between said drain and source regions;

a second conductivity type channel layer disposed in said substrate and at the surface proximate said gate electrode between said drain and source regions; and

a first conductivity type buried region disposed in said substrate between and bounded by said channel layer, said drain and source regions, and said embedded region, said drain and source regions being completely surrounded in said substrate by and contiguous with said embedded region wherein said embedded region is heavily doped relative to said buried region and said source and drain regions are heavily doped relative to said channel layer.

4,894,693

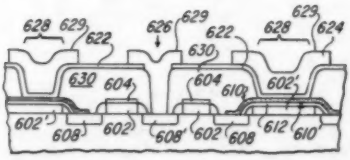
SINGLE-POLYSILICON DRAM DEVICE AND PROCESS

Howard L. Tigelaar, 505 Meadowcreek Dr., Allen, Tex. 75002; Roger A. Haken, 4236 Goodfellow Dr., Dallas, Tex. 75229, and Thomas C. Holloway, 7007 Walling La., Dallas, Tex. 75231

Continuation-in-part of Ser. No. 837,611, Mar. 7, 1986, abandoned, and a continuation-in-part of Ser. No. 729,318, May 1, 1985, Pat. No. 4,821,085. This application Dec. 5, 1986, Ser. No. 938,486

Int. Cl.[4] H01L *29/78, 27/02, 29/04, 23/48*

U.S. Cl. 357—23.6 **26 Claims**



1. A read/write memory cell formed at a surface of a semiconductor body, comprising:

a pass transistor, comprising:

first and second diffused regions at said surface of said semiconductor body, said first diffused region clad with a metal silicide; and

a gate electrode disposed above a portion of said surface lying between said first and second diffused regions; and

a storage capacitor, comprising:

a first plate;

a storage dielectric disposed adjacent said first plate; and

a second plate, disposed adjacent said storage dielectric opposing said first plate, said second plate of a material comprising the metal of said metal silicide and in contact with said first diffused region.

4,894,694

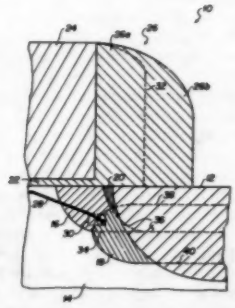
MOSFET STRUCTURE AND METHOD FOR MAKING SAME

Kit M. Cham, Sunnyvale, and Paul V. Voorde, Mountain View, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Division of Ser. No. 926,318, Oct. 31, 1986, Pat. No. 4,746,624. This application Jan. 20, 1988, Ser. No. 146,068

Int. Cl.[4] H01L *29/78*

U.S. Cl. 357—23.3 **5 Claims**



1. A MOSFET structure comprising:

a source region, a drain region, a channel region located between said source region and said drain region, and gate means disposed over said channel region;

a tip region disposed between said channel region and said drain region, said tip region having a lower conductivity than said drain region;

a buried region disposed below said tip region and shifted laterally towards said drain region relative said tip region, said buried region having a higher conductivity than said tip region but a lower conductivity than said drain region; and

a blocking region disposed between said tip region and said drain region and above said buried region, said blocking region having a lower conductivity than said tip region,

wherein said source region, said drain region, said tip region and said buried region are all p-type regions.

4,894,695

SEMICONDUCTOR DEVICE WITH NO STRESS GENERATED AT THE TRENCH CORNER PORTION AND THE METHOD FOR MAKING THE SAME

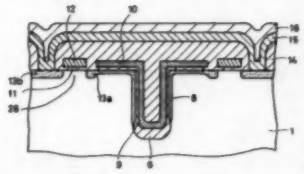
Tatsuya Ishii; Yoshinori Okumura, and Masao Nagatomo, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 17, 1988, Ser. No. 169,062

Claims priority, application Japan, Mar. 23, 1987, 62-69431

Int. Cl.[4] H01L *29/78, 29/06, 27/12*

U.S. Cl. 357—23.6 **14 Claims**



1. A semiconductor device comprising:

a semiconductor substrate having a main surface, a prescribed impurity concentration of a first conductivity type and a trench;

a thick insulating film formed on either a bottom portion or a sidewall portion of said trench, an end portion of said thick insulating film extending in either a vertical upward direction when said thick insulating film is formed on the bottom portion or a horizontal direction when the thick insulating film is formed on the sidewall portion;

a thin insulating film extending in the direction orthogonal to said thick insulating film and connected to the end portion of said thick insulating film; and

a first impurity region of a second conductivity type formed in said semiconductor substrate on either the sidewall portion or the bottom portion and the sidewall portion of said trench on which said thick insulating film is not formed, only in the side portion or lower portion of said thin insulating film, said thick insulating film is formed by

forming a two-layer film constituted by an oxide film and a nitride film on the main surface of said semiconductor substrate, side portions and a portion of the bottom portion of the trench, and

forming a selective oxide film to form said thick insulating film on the bottom portion of the trench of said semiconductor substrate by oxidizing said semiconductor substrate with said two-layer film formed thereon, whereby

the direction of extension of the end portion of said selective oxide film changing from horizontal to vertical upward with a large curvature.

4,894,696

DYNAMIC RANDOM ACCESS MEMORY HAVING A TRENCH CAPACITOR

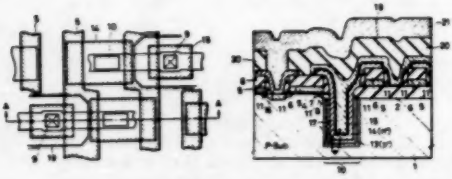
Eiji Takeda, Koganei; Kiyoo Itoh, Higashikurume; Ryoichi Hori, Tokyo; Katsuhiro Shimohigashi, Musashimurayama, and Katsutaka Kimura, Sagamihara, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 8, 1986, Ser. No. 938,967

Claims priority, application Japan, Dec. 10, 1985, 60-276076

Int. Cl.[4] H01L *29/78*

U.S. Cl. 357—23.6 **30 Claims**



1. A semiconductor device comprising:

a semiconductor body;

a field effect transistor provided on the semiconductor body, including a gate electrode and sidewall insulators formed on side surfaces of said gate electrode; and

a trench capacitor which is at least partly formed in said semiconductor body,

wherein the trench of said trench capacitor is a substantially vertical wall trench and is formed being self-aligned to said sidewall insulator of said gate electrode, said trench capacitor forming the memory capacitor of a transistor memory cell of a dynamic random access memory,

and wherein said memory capacitor is provided in the trench and extends over said gate electrode.

4,894,697

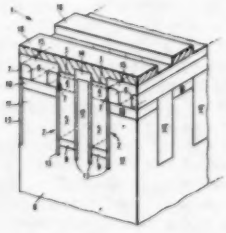
ULTRA DENSE DRAM CELL AND ITS METHOD OF FABRICATION

Daeje Chin, Seoul, Rep. of Korea, and Sang H. Dhong, Mahopac, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 31, 1988, Ser. No. 264,418

Int. Cl.[4] H01L *29/78*

U.S. Cl. 357—23.6 **13 Claims**



1. An ultra dense dynamic random access memory array comprising:

a conductive substrate (8)(11)(12) having a plurality of rows of single crystal semiconductor devices (2) disposed in insulated spaced relationship with said substrate (8)(11)(12) said substrate having insulation (10) covered portions (11) which extend between pairs of devices (2) in each row and between insulation regions (17') rows of which are disposed between said rows of semiconductor devices (2), the tops of said insulation regions (17') being level with the tops of said insulation (10) covered portions (11) forming a plurality of gate conduits perpendicular to said rows of semiconductor devices (2), a pair of gate electrodes (6) disposed in each of said gate conduits, each of said pair of gate electrodes being in insulated spaced relationship with each other and with a portion (4) of each of said semiconductor devices (2) in an associated column of said semiconductor devices (2), and a plurality of conductive bit lines (16) disposed orthogonally with said gate electrodes (6) each of said lines contacting a portion (3) different from said first mentioned portion (4) of each of said semiconductor devices (2) arranged in the same row.

4,894,698

FIELD EFFECT PRESSURE SENSOR

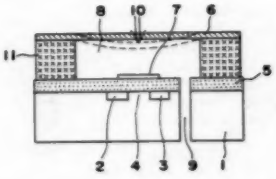
Masaya Hijikigawa, Yamatokoriyama; Shuji Miyoshi, Nara, and Hisashi Akiyama, Tenri, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 227,489, Aug. 1, 1988, abandoned, which is a continuation of Ser. No. 921,196, Oct. 21, 1986, abandoned. This application Apr. 17, 1989, Ser. No. 338,545

Claims priority, application Japan, Oct. 21, 1985, 60-235945; Dec. 20, 1985, 60-288200

Int. Cl.[4] H01L *29/84, 29/66, 29/78*; G01L *9/12*

U.S. Cl. 357—26 **3 Claims**



1. A pressure sensor, comprising:

a field effect transistor, including,

a semiconductor substrate,

a source region and a drain region formed in said semiconductor substrate,

a channel formed between said source and drain regions,

a gate insulation film formed over said source, drain and channel regions,

an auxiliary gate electrode formed over a portion of said gate insulation film,

an upper gate electrode formed above said auxiliary gate electrode, and

a spacer located between said upper and auxiliary gate electrodes;

said upper gate electrode, spacer and gate insulation film forming boundaries of a hollow chamber located between said upper and auxiliary gate electrodes, said hollow chamber being in communication with an outside surface of said substrate through an orifice extending through said semiconductor substrate and said gate insulation film;

said upper and auxiliary gate electrodes forming an electrostatic capacitor, said upper gate electrode being deformable with pressure to vary the distance between said upper and auxiliary gate electrodes to change the electrostatic capacitance of said capacitor;

a pressure difference between the pressure on said upper gate electrode and the pressure communicated to said hollow chamber by said orifice being detected as a variation in drain current of said filed effect transistor.

4,894,699

OPTICAL CONTROL CIRCUIT AND SEMICONDUCTOR DEVICE FOR REALIZING THE CIRCUIT

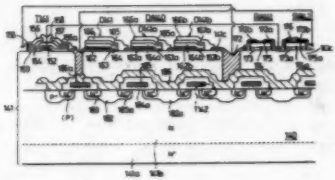
Yutaka Hayashi, Ibaragi; Shigeaki Tomonari, and Keizi Kakite, both of Osaka, all of Japan, assignors to Agency of Industrial Science & Technology, Ibaragi and Matsushita Electric Works, Ltd., Osaka, both of, Japan

Continuation of Ser. No. 87,645, Aug. 19, 1987, abandoned. This application Jan. 25, 1989, Ser. No. 302,079

Claims priority, application Japan, Aug. 20, 1986, 61-195810

Int. Cl.[4] H01L *27/14*

U.S. Cl. 357—30 14 Claims



1. A semiconductor device comprising at least two different semiconductor devices taken from a group consisting of a photoconductor, a resistor, and a transistor, said two different semiconductor devices each comprising and being operatively connected through an identical semiconductor layer structure of a first conduction type semiconductor layer, a low impurity concentration semiconductor layer, and a second conduction type semiconductor layer stacked in that order on a substrate, wherein one of said two different semiconductor devices further comprises a pair of mutually separated electrode layers stacked on said second conduction type semiconductor layer to form first and second conductive electrodes, said second conduction type semiconductor layer comprises mutually separated first and second parts, and said first and second conductive electrodes are provided in contact with said first and second parts of said second conduction type semiconductor layer.

4,894,700

IMAGE SENSOR

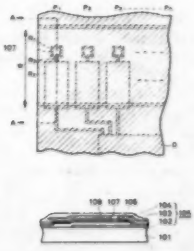
Mamoru Nobue, and Sadahiro Tei, both of Ebina, Japan, assignors to Fuji Xerox Co., Ltd., Japan

Filed Apr. 7, 1986, Ser. No. 849,145

Claims priority, application Japan, Apr. 9, 1985, 60-74766; Apr. 30, 1985, 60-93055; Jul. 17, 1985, 60-157182; Aug. 23, 1985, 60-185282

Int. Cl.[4] H01L *45/00*; H01J *40/14*

U.S. Cl. 357—30 18 Claims



1. An image sensor comprising:

a substrate;

a plurality of light receiving elements of a sandwich type juxtaposed with each other on said substrate, each of said light receiving elements including a lower electrode, a photoconductive layer disposed over said lower electrode and an upper electrode disposed over said photoconductive layer, one of said lower electrode and said upper electrode being light permeable, said lower electrode, said photoconductive layer and said upper electrode partially overlapping each other to form an overlapped region for each of said light receiving elements, said overlapped region having an area and a capacitance whose magnitude is determined in accordance with the area;

light shielding means disposed to cover said overlapped region for each of said light receiving elements and formed with a plurality of windows of a predetermined size for allowing light to enter a part of said overlapped region;

driving means for driving said light receiving elements;

a plurality of connecting sections formed on said substrate, each of said connecting sections having a length and a capacitance whose magnitude is determined in accordance with the length connecting each of said light receiving elements to said driving means; and

wherein the area of the overlapped region for each of said light receiving elements is determined such that the sum of the capacitance of said overlapped region for one of said light receiving elements and the capacitance of the one of said connecting sections associated with the overlapped region for said one of said light receiving elements is made equal to the sum of the capacitance of said overlapped region for another one of said light receiving elements and the capacitance of another one of said connecting sections associated with the overlapped region for said another one of said light receiving elements.

4,894,701

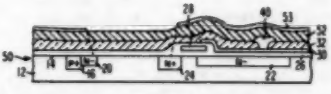
SEMICONDUCTOR DEVICE DETECTOR AND METHOD OF FORMING SAME

Harry G. Erhardt, Fayetteville, N.Y., and Walter F. Kosonocky, Skillman, N.J., assignors to General Electric Company, Schenectady, N.Y.

Filed May 9, 1988, Ser. No. 192,043

Int. Cl.[4] H01L *27/14*

U.S. Cl. 357—30 7 Claims



1. A semiconductor device for detecting radiation comprising:

a substrate having a major surface;

a first insulating layer overlying a portion of said surface;

a first level semiconductor layer disposed completely within said first insulating layer;

a second insulating layer overlying said first level semiconductor layer;

a first metallic contact which extends through said second insulating layer and electrically contacts said first level semiconductor layer;

a third insulating layer overlying said metallic contact; and

a detector region which is spaced apart from said metallic contact and said detector region extends through said first, second and third insulating layers to said major surface.

4,894,702

HIGH EFFICIENCY, SMALL GEOMETRY SEMICONDUCTOR DEVICES

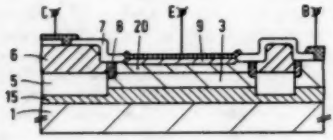
Henricus G. R. Maas; Johannes W. A. Van Der Velden; Peter H. Kraaen; Albertus T. M. Van De Goor, and Date J. W. Noorlag, all of Eindhoven, Netherlands, assignors to U.S. Philips Corp., New York, N.Y.

Filed Mar. 3, 1988, Ser. No. 163,428

Claims priority, application Netherlands, Mar. 18, 1987, 8700640

Int. Cl.[4] H01L *29/72, 29/04, 29/40, 23/48*

U.S. Cl. 357—34 **5 Claims**



1. A semiconductor device comprising a monocrystalline semiconductor body of silicon, in which at least a first region of a first conductivity type is laterally bounded by a second region comprising a countersunk oxide layer, a highly doped silicon layer of the second conductivity type opposite to that of the first conductivity type disposed on said oxide layer, and a second oxide layer which is disposed on said oxide layer, and a second oxide layer which is disposed on said highly doped silicon layer, is at least partly countersunk into it and extends into the first region, a highly doped contact zone of the second conductivity type, said silicon layer adjoining said highly doped contact zone of the second conductivity type, a semiconductor zone formed in said first region which is substantially bounded by the edge of the second oxide layer and forms part of a semiconductor circuit element, said contact zone being electrically coupled to said semiconductor zone and said silicon layer being connected to a connection conductor, the upper side of the silicon layer being located at a higher level than the surface of the first region, and further comprising an intermediate region located in the first region at least in part directly below the second oxide layer and having a lower doping concentration than that of the contact zone, said contact zone being electrically coupled to said semiconductor zone by said intermediate region.

4,894,703

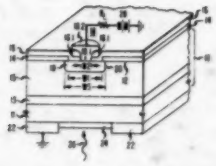
RESTRICTED CONTACT, PLANAR PHOTODIODE

Mahmoud A. E. Hamamsy, Watchung; Stephen R. Forrest, Chatham, and John R. Zuber, Piscataway, all of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Continuation-in-part of Ser. No. 359,988, Mar. 19, 1982, abandoned. This application Aug. 20, 1985, Ser. No. 767,613

Int. Cl.[4] H01L *27/14*

U.S. Cl. 357—30 **5 Claims**



1. A two-terminal back-illuminated, planar photodiode comprising

a Group III-V compound semiconductor body having a first major surface and an opposite major surface,

a first silicon nitride single layer formed on said first surface, said first layer having a first opening therein for introducing a dopant into said body to form a p-n junction which intersects said surface at points recessed from the edge of said first opening,

a second silicon nitride layer formed so as to contact said first layer along its entire length, said second layer having a second opening which lies within said first opening,

a single electrical contact to said first surface, said contact including: a pedestal portion formed in said second opening so as to have an interface with said second layer and positioned remote from the points where said junction intersects said surface, and a cap portion overlapping said pedestal portion so as to seal said interface, said pedestal portion being positioned sufficiently remote from said points so as to reduce stress induced at said points, and

a second electrical contact to said opposite major surface,

said second contact being adapted to permit lightwaves to be detected to be incident on said opposite major surface.

4,894,704

LEAD FRAME HAVING PROJECTIONS FOR RESIN MOLDING

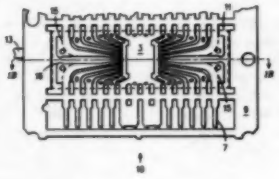
Kazuyuki Endo, Aizuwakamatsu, Japan, assignor to Motorola Inc., Schaumburg, Ill.

Filed Dec. 12, 1988, Ser. No. 282,646

Claims priority, application Japan, Jan. 28, 1988, 63-15858

Int. Cl.[4] H01L *23/48, 23/28*

U.S. Cl. 357—70 **5 Claims**



1. A lead frame comprising:

an inner lead part electrically connected to an internal device and contained within a mold cavity together with the internal device for being resin molded;

and an outer lead part connected to the inner lead part;

characterized in that said inner lead part has at least one projection with which a flow of resin for molding passed through a gate of the mold is collided thereby eliminating voids throughout said molding resin.

4,894,705

SEMICONDUCTOR DEVICE

Setsufumi Kamuro, Chiba, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Sep. 24, 1987, Ser. No. 100,920

Claims priority, application Japan, Dec. 16, 1986, 61-300673

Int. Cl.[4] H01L *23/48, 23/52*

U.S. Cl. 357—71 **11 Claims**

1. A semiconductor device comprising

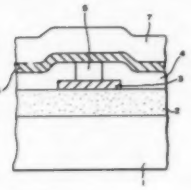
a first wiring layer,

a second wiring layer,

an inter-layer insulative film between said first wiring layer and said second wiring layer, and

a plurality of polysilicon sections sandwiched between said first and second wiring layers, different ones of said polysilicon sections being separated by said inter-layer insulative film, selected ones of said polysilicon sections being low-resistance polysilicon sections and the rest of

said polysilicon sections being high-resistance polysilicon sections such that said first and second wiring layers are



electrically connected with each other through each of said low-resistance polysilicon sections.

4,894,706

THREE-DIMENSIONAL PACKAGING OF SEMICONDUCTOR DEVICE CHIPS

Yoshiyuki Sato; Kazuhide Kiuchi, both of Atsugi; Junji Watanabe; Kunio Koyabu, both of Tokyo; Masanobu Oohata, Atsugi, and Katsuhiko Aoki, Tokyo, all of Japan, assignors to Nippon Telegraph and Telephone Corporation, Tolyo, Japan

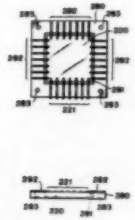
PCT No. PCT/JP86/00065, § 371 Date Oct. 9, 1986, § 102(e) Date Oct. 9, 1986

PCT Filed Feb. 14, 1986, Ser. No. 919,001

Claims priority, application Japan, Feb. 14, 1985, 60-25180; Nov. 12, 1985, 60-252016; Jan. 25, 1986, 61-12989

Int. Cl.[4] H01L *23/28*

U.S. Cl. 357—72 **33 Claims**



1. An elementary unit for a three-dimensional packaging structure for semiconductor device chips, comprising:

a semiconductor device chip;

a chip carrying member having a first surface and a second surface substantially parallel to each other, a device opening with which said semiconductor device chip is loosely engaged and at least one aperture for receiving an aligning rod, said chip carrying member having leads disposed on said first surface for holding said semiconductor device chip to said carrying member; and

a plastic insulating material layer having at least one aperture which is aligned with a corresponding aperture of said chip carrying member, said plastic insulating material layer being fixed to the second surface of said chip carrying member.

4,894,707

SEMICONDUCTOR DEVICE HAVING A LIGHT TRANSPARENT WINDOW AND A METHOD OF PRODUCING SAME

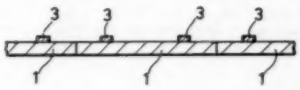
Masao Yamawaki, and Takashi Kondo, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 12, 1988, Ser. No. 155,598

Claims priority, application Japan, Feb. 12, 1987, 62-30551

Int. Cl.[4] H01L *21/56*

U.S. Cl. 357—74 **8 Claims**



1. A semiconductor device having a light transparent window, comprising:

a semiconductor chip having a light receiving section formed on a portion of a first surface of said semiconductor chip;

a wall disposed on said first surface of said semiconductor chip surrounding said light receiving section;

a molding resin formed to predetermined dimensions over the surfaces of said semiconductor chip excluding said portion of said first surface having said light receiving section formed thereon for forming an opening in said molding resin to said light receiving section; and

a light introduction section formed by attaching the light transparent window to said molding resin over said opening, said semiconductor chip being separated from the light transparent window by a distance determined by said predetermined dimensions of said molding resin.

4,894,708

LSI PACKAGE HAVING A MULTILAYER CERAMIC SUBSTRATE

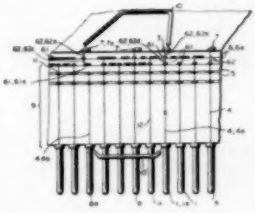
Toshihiko Watari, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jul. 12, 1984, Ser. No. 630,266

Claims priority, application Japan, Jul. 19, 1983, 58-131422

Int. Cl.[4] H01L *39/02, 27/02*

U.S. Cl. 357—80 **9 Claims**



1. A large scale integrated package comprising:

a substrate;

a plurality of first input/output terminals mounted onto a first face of said substrate;

a plurality of first pads mounted onto a second face of said substrate for receiving integrated chip terminals, each of said plurality of first pads corresponding to a different one of said plurality of first input/output terminals;

a plurality of second input/output terminals mounted onto said first face of said substrate, wherein said plurality of second input/output terminals are spare terminals;

a plurality of second pads mounted onto said second face of said substrate, each of said second pads corresponding to a different one of said plurality of second input/output terminals, wherein said second pads are spare pads;

a plurality of electrically conductive first paths formed within said substrate for connecting each of said first pads to said corresponding one of said first input/output terminals;

a plurality of electrically conductive second paths formed within said substrate for connecting each of said second pads to said corresponding one of said second input/output terminals; and

wherein, in operation, a signal passes through said second paths only when at least one of said plurality of second pads is connected to one of said plurality of first pads via a first repair wire.

4,894,709

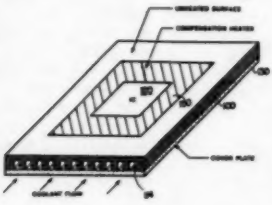
FORCED-CONVECTION, LIQUID-COOLED, MICROCHANNEL HEAT SINKS

Richard J. Phillips, Billerica; Leon R. Glicksman, Lynnfield, and Ralph Larson, Bolton, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Mar. 9, 1988, Ser. No. 166,512

Int. Cl.[4] H01L *25/04*

U.S. Cl. 357—82 **10 Claims**



1. A method of using a microchannel heat sink to cool a high power device such as an integrated circuit, said method comprising the steps of:

forcing a fluid into an input port of said microchannel heat sink;

passing said fluid through a plurality of channels in said microchannel heat sink to creat. a turbulent flow through said channels, said channels having a width between 125 and 300 micrometers, and being in thermal contact with said high power device to thereby transfer heat from said high power device to said fluid; and

discharging said fluid from said microchannel heat sink to thereby dissipate said heat.

4,894,710

SYSTEM FOR PROCESSING COLOR TELEVISION SIGNALS WITH AMPLITUDE MODULATION ENCODED CHROMINANCE INFORMATION

Silvio Cucchi, Gaggiano; Marco Modena, Milan, and Roberto Peruta, Ponte S. Pietro, all of Italy, assignors to Telettra Telefonia Elettronica e Radio S.p.A., Milan, Italy

Filed Dec. 14, 1987, Ser. No. 132,428

Claims priority, application Italy, Dec. 17, 1986, 22717 A/86

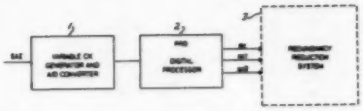
Int. Cl.[4] H04N *11/04*

U.S. Cl. 358—13 **8 Claims**

1. A system for processing color television signals having amplitude modulation encoded chrominance information comprising chrominance signals c1 and c2 and a baseband component comprising a luminance signal y, said system permitting the encoding of said color television signals through a unidimensional or bidimensional transform with high efficiency, said system comprising:

(a) means for performing analog to digital conversion of said composite color television signal in conjunction with a variable frequency sampling clock ck(t); and

(b) means for periodically transforming the signal output from said analog to digital conversion means into signals



py, pc1 and pc2 comprising a pseudo luminance signal and two pseudo chrominance signals, respectively, which are correlated to, but are otherwise different than, said component signals y, c1, c2.

4,894,711

BEAM INDEX DISPLAY TUBE AND DISPLAY SYSTEM INCLUDING THE BEAM INDEX DISPLAY TUBE

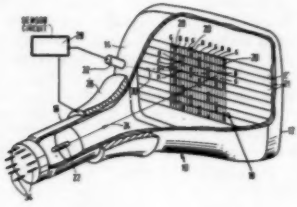
Piet G. J. Barten, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 11, 1988, Ser. No. 255,930

Claims priority, application United Kingdom, Oct. 16, 1987, 8724320

Int. Cl.[4] H04N *9/24*

U.S. Cl. 358—68 **17 Claims**



1. A beam index display tube comprising an envelope; and electron gun; and a cathodoluminescent screen, the cathodoluminescent screen comprising a plurality of transversely extending substantially contiguous lines, each line comprising a plurality of triplets of different colour emitting elements and index elements spatially positioned between at least one pair of color emitting elements of at least some of the triplets, selected index elements in each line being offset heightwise in opposite directions to partially overlap their adjacent lines; and means for detecting index signals produced in response to scanning the index elements by an electron beam produced by the electron gun.

4,894,712

DENSITY GRADATION CONTROL TYPE THERMAL PRINTER

Tadashi Katsukawa, Osaka, Japan, assignor to NEC Home Electronics Ltd., Osaka, Japan

Filed Oct. 24, 1988, Ser. No. 261,616

Claims priority, application Japan, Oct. 23, 1987, 62-267424; Apr. 27, 1988, 63-104983

Int. Cl.[4] G01D *15/10*

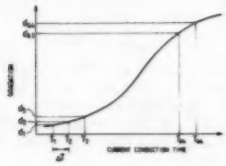
U.S. Cl. 346—76 PH **5 Claims**

1. A density gradation control type thermal printer for printing a plurality of print lines, each having a plurality of picture elements, comprising:

a plurality of heating resistor elements arranged in one-to-one correspondence with said plurality of picture elements on every print line;

first means for selectively energizing said heating resistor

elements for each print line into current conduction, each for a time equivalent to an integer multiple of a current conduction unit time, to thereby give density gradation to said picture elements; and



second means for selectively starting said energizing in a descending order of current conduction time for every print line.

4,894,713

METHOD OF CODING VIDEO SIGNALS

Paul Delogne, Limelette; Benoit Macq, Brussels, and Luc Vandendorpe, Dottignies, all of Belgium, assignors to The Belgian State, Brussels, Belgium

Filed Jun. 1, 1988, Ser. No. 200,933

Claims priority, application Belgium, Jun. 5, 1987, 8700623

Int. Cl.[4] H04N *7/133, 7/137*

U.S. Cl. 358—133 **10 Claims**

1. A method of coding video signals comprising:

reading data relative to a a still or moving video image in successive blocks;

subjecting the data to orthogonal transformation;

quantizing the transformed coefficients;

storing by rank signals representing the coefficients in organized blocks of memory;

retrieving from memory signals representing the coefficients in groups of blocks, in a predetermined scanning order, the signals of each coefficient in each set being taken in a separate block belonging to said group of blocks; and

applying the coefficients of the transformation in the form of binary signals to a variable length coder.

9. A method of coding video signals comprising:

reading data relative to a still or moving video image in successive blocks;

subjecting the data to orthogonal transformation;

quantizing the coefficients of the transformation; and

applying the coefficients of the transformation to a redundancy reducing coder;

wherein each one of the transformed coefficients (Y_{n1n2}) of the transformation is obtained by multiplying the transformed coefficients (X_{n1n2}) of a unitary transformation known in itself by factors ($\sqrt{W_{n1n2}}$) such that the quantization noise power weighted by the sensitivity of the eye as a function of the spatial frequencies is minimal, said weighting being carried out independently of the statistical properties of the images.

4,894,714

APPARATUS USING TELETEXT TO PROVIDE CHANNEL IDENTIFICATION INFORMATION IN A TELEVISION TRANSMISSION SYSTEM

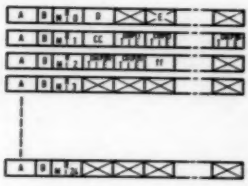
Wilhelmus J. Christis, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 2, 1987, Ser. No. 104,319

Claims priority, application Netherlands, Oct. 3, 1986, 8602494

Int. Cl.[4] H04N *7/10, 7/087*

U.S. Cl. 358—86 **17 Claims**



1. A receiver comprising:

(i) a teletext decoding circuit for capturing and decoding teletext pages;

(ii) a programmable tuning data memory for programmably storing and for supplying translations of station identifiers into tuning data which are characteristic of respective transmission channels;

(iii) a receiver tuning circuit for tuning the receiver to a transmission channel in response to a tuning datum from the tuning data memory; and

(iv) a control circuit which is coupled to the teletext decoding circuit, to the tuning data memory, and to the tuning circuit and which controls a scanning and storing operation comprising controlling:

(a) the tuning circuit to tune the receiver to a present channel;

(b) the teletext decoding circuit to capture and decode teletext data from the present channel, control actions of (a) and (b) being repeated on further channels until teletext data is captured and decoded which includes at least a repetitive part of an information page including information regarding which transmission channels are utilized for transmitting TV stations; and

(c) the tuning data memory to store tuning data in response to the information page, which tuning data are characteristic of the transmission channels indicated on the information page and utilized for transmitting TV stations, whereby the receiver thereafter automatically and repeatably associates all user requests for a desired station identifier with an appropriate tuning datum for an appropriate TV transmission channel according to the information captured and decoded from the information page.

4,894,715

ELECTRONIC ENDOSCOPE

Akinobu Uchikubo; Masahiko Sasaki; Katsuyuki Saito; Masahide Kanno, all of Hachioji, and Jun Hasegawa, Hino, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Sep. 14, 1988, Ser. No. 244,215

Claims priority, application Japan, Jan. 8, 1988, 63-002044

Int. Cl.[4] H04N *7/18;* **A61B** *1/04*

U.S. Cl. 358—98 **40 Claims**

1. An electronic endoscope apparatus comprising:

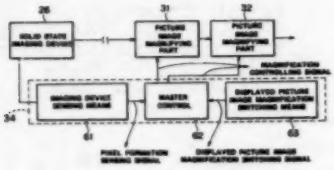
an imaging means having an elongated insertable part to be inserted into a body cavity and a solid state imaging device outputting as an electric signal an object image obtained through an observing window provided in the tip part of said insertable part;

a video signal processing means driving said solid state

imaging device and processing said read out electric signal to produce a video signal;

a picture image displaying rate varying means capable of either magnifying or contracting in at least one of the vertical direction and horizontal direction said object image imaged by said solid state imaging device on the basis of the picture image displaying rate by inputting said video signal;

a monitor means displaying said object image magnified or contracted by said picture image displaying rate varying means;



a picture image displaying rate controlling means capable of controlling independently in at least one of the vertical direction and horizontal direction the picture image displaying rate of said picture image displaying rate varying means adjust the view angle of the picture image displayed by said monitor means; and

a sensing and instructing means sensing or instructing the factor varying said displaying view angle and outputting a signal relating to the picture image displaying rate to said picture image displaying rate controlling means.

4,894,716

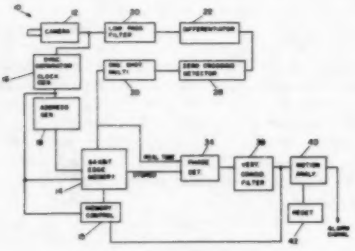
T.V. MOTION DETECTOR WITH FALSE ALARM IMMUNITY

Felix Aschwanden, Thalwil, and Theodor E. Bart, Kindhausen, both of Switzerland, assignors to Burle Technologies, Inc., Lancaster, Pa.

Filed Apr. 20, 1989, Ser. No. 341,076

Int. Cl.[4] H04N 7/18

U.S. Cl. 358—105 **5 Claims**



1. In a motion detector for a television viewing field of the type in which a television camera's output signal is processed in series by a low pass filter, a differentiator, a zero crossing detector and digital pulse generator so that digital signals related to edges visible in the viewing field are furnished to a following storage memory and to a comparison circuit which receives the real-time signals from the digital pulse generator and also the stored signals of a previous field from the storage memory and compares them and produces an alarm output signal if a difference between them indicates edge movement, the improvement wherein the comparison circuit comprises a phase detector circuit comprising an XOR gate receiving the real-time and stored signals with the XOR gate output connected to a first monostable multivibrator whose output is connected to a first input of a second monostable multivibrator and with the XOR gate output also connected to a second trigger input of the second monostable multivibrator, the output of which produces a motion indicating signal only when the difference in real-time and stored signals surpasses the output pulse length of the first monostable multivibrator.

4,894,717

DELIVERED ARTICLE STORAGE CONTROL SYSTEM

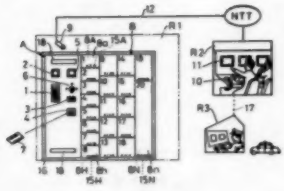
Yutaka Komei, Osaka, Japan, assignor to Kabushiki Kaisha Fulltime System, Osaka, Japan

Filed Mar. 27, 1989, Ser. No. 328,623

Claims priority, application Japan, Mar. 28, 1988, 63-40980; Mar. 8, 1989, 64-27053

Int. Cl.[4] H04N 7/18

U.S. Cl. 358—108 **5 Claims**



1. A delivered article storage control system comprising a control box equipped with a receipt issuing printer, an instruction display and/or an audio message output speaker, an identification card reader, a monitor display for a burglar detection camera and an input keyboard, and a delivered article storage box equipped with a plurality of lockers, each of which is equipped with a door which can be opened when an identification card is entered into said card reader and an article presence/absence detection sensor, wherein said two boxes and said burglar detection camera are installed in a visitor reception room, said monitor display for said burglar detection camera is installed in a control room and said two rooms are connected to each other via a telephone line, and a control unit is further provided to control said burglar detection camera, printer, instruction display and/or speaker, monitor display and card reader so that said identification card entered into said card reader can be read and so that said door of said corresponding locker is opened/closed according to the information stored on said card.

4,894,718

METHOD AND SYSTEM FOR TESTING VIDEO

Chan C. Hung, Hsin Chu, Taiwan, assignor to Acer Incorporated, China

Filed Mar. 29, 1989, Ser. No. 329,921

Int. Cl.[4] H04N 17/04

U.S. Cl. 358—139 **2 Claims**

1. A video signal testing system for connecting with a data bus of an expansion slot of a unit under test for two way data transmissions for receiving IOR, IOW, AEN, and address signals therefrom, and for receiving video signals from a video connector, wherein the system comprises:

tri-state buffer means connecting with the data bus of the expansion slot of the unit under test for two-way data transmissions under control of input ENABLE and DIRECTION signals;

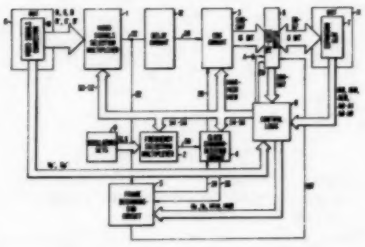
control logic means for receiving data signals from the tri-state buffer means, the IOR, IOW, AEN and address signals from the expansion slot of the unit under test, and for supplying horizontal and vertical sync signals, the ENABLE signal and DIRECTION signal to the tri-state

buffer, and supplying a start-up signal and read-out signals;

an oscillator set for supplying clock signals corresponding to the testing video signals;

a frame beginning-end circuit for detecting the completion of the video signals of a full-frame in response to the horizontal sync and vertical sync signals, the start-up signal, the read-out signals, and video signals, and for supplying the detection signal to the tri-state buffer;

clock synchronization circuit for generating a sync clock which is synchronous in frequency and phase with the video signals of said unit under test in response to the



clock signals from the oscillator set and the clock enable signal from the frame beginning-end circuit;

delay circuit connected to receive video signals from the video connector and supply the video signals, after being delayed for a specific amount of time; and

cyclic redundancy check circuit for receiving the start-up signal from the control logic means, video signals from the delay circuit and the sync clock from the clock synchronization circuit, wherein the video signals and sync clock enter the cyclic redundancy check circuit substantially at the same time causing one sync clock to sample one video signal, and wherein a fixed value is supplied to the tri-state buffer under the control of the read-out signals.

4,894,719

SYNCHRONIZING SIGNAL AUTOMATIC SELECTING CIRCUIT

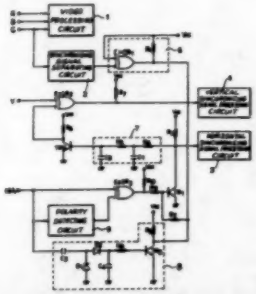
Ik H. Moon, Kyungsangbook, Rep. of Korea, assignor to Goldstar Co., Ltd., Seoul, Rep. of Korea

Filed Jul. 25, 1988, Ser. No. 223,551

Claims priority, application Rep. of Korea, Jul. 30, 1987, 8367/1987

Int. Cl.[4] H04N *5/08*

U.S. Cl. 358—153 **6 Claims**



1. A synchronizing signal automatic selecting circuit having a horizontal and horizontal/vertical synchronizing signal terminal HHV which circuit is coupled to a horizontal synchronizing signal processing circuit, a vertical synchronizing signal processing circuit, and a vertical synchronizing signal input terminal V comprising a synchronizing signal separating circuit for separating a synchronizing signal from color signals or a color signal, a signal inverter means for inverting the synchronizing signal output from said synchronizing signal separating circuit, a synchronizing signal detecting element for detecting the synchronizing signal when the synchronizing signal is inputted to the horizontal and horizontal/vertical synchronizing signal input terminal HHV and grounding the output signal of said signal inverter means, a polarity detecting means for detecting the synchronizing signal polarity of said horizontal and horizontal/vertical synchronizing signal input at said terminal HHV, an exclusive OR-gate for combining the output signal of said polarity detecting means and the synchronizing signal of the horizontal and horizontal/vertical synchronizing signal input terminal, a first transistor for inverting the output signal of said exclusive OR-gate or the output signal of the signal inverter means and applying it to the horizontal synchronizing signal processing circuit, a vertical synchronizing signal separate means for separating the vertical synchronizing signal from the output signal of said first transistor, a second transistor for inverting the output signal of said vertical synchronizing signal separator means and an exclusive OR-gate for combining the output signal of said second transistor and the vertical synchronizing signal of the vertical synchronizing signal input terminal and applying it to the vertical synchronizing signal processing circuit.

4,894,720

CIRCUIT FOR SELECTIVELY OUTPUTTING HIGH FREQUENCY SIGNALS

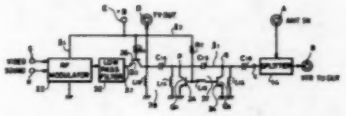
Shuhei Kamada, Minou, Japan, assignor to Sanyo Electric Co., Ltd., Moriguchi, Japan

Filed Jul. 28, 1988, Ser. No. 225,319

Claims priority, application Japan, Jul. 31, 1987, 62-193282; Jul. 31, 1987, 62-118379[U]

Int. Cl.[4] H04N *5/268*

U.S. Cl. 358—181 **15 Claims**



1. A circuit for selectively outputting high frequency signals which selectively switches between first high frequency signals inputted from an input terminal and second high frequency signals outputted from a RF modulator to output the same from an output terminal, comprising:

a first transmission line transmitting said first high frequency signals from said input terminal to said output terminal;

a second transmission line transmitting said second high frequency signals from said RF modulator to said output terminal;

first filter means including a plurality of first passive devices interposed in series in said first transmission line for determining high frequency signal passing characteristics of the first transmission line;

first switch means provided in said first transmission line for switching between passage and cut off of the high frequency signal in said first transmission line in response to an applied first control voltage;

second switch means provided in said second transmission line for switching complementary with said first switch means between the passage and cut off of the high frequency signals in said second transmission line in response to an applied second control voltage;

first control voltage supplying means for supplying said first control voltage to said first switch means; and

second control voltage supplying means for supplying said second control voltage to said second switch means; wherein

said first switch means comprises

at least two grounding transistors having their collectors and emitters interposed between both ends of a first passive device and a reference potential point and their bases receiving said first control voltage, and

a second passive device connected between bases of said at least two grounding transistors; and

when said grounding transistors are turned on, said second passive device is connected in parallel to said first passive device to form a parallel resonance circuit with the first passive device, with the parallel resonance circuit has its resonance frequency selected to stop the passage of signals in the same band as said second high frequency signals.

4,894,721

METHOD AND APPARATUS FOR SOLID STATE IMAGE PROCESSING

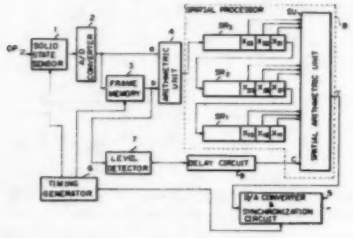
Hikaru Matsuda, Kanagawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 17, 1988, Ser. No. 169,411

Claims priority, application Japan, Mar. 19, 1987, 62-64959

Int. Cl.[4] H04N *5/217*

U.S. Cl. 358—213.17 **6 Claims**



1. A method of solid state image processing comprising the steps of:

(a) converting an external uniformly illuminated scene into reference digital signals corresponding to respective pixels;

(b) deriving from said reference digital signals corresponding respective offset signals;

(c) establishing a predetermined reference level;

(d) comparing said corresponding respective offset signals with said predetermined reference level to determine defective pixels;

(e) converting an external scene into digital signals corresponding to respective pixels;

(f) subtracting said respective offset signals from said corresponding respective digital signals to determine an output video signal corresponding to a respective pixel;

(g) substituting a video signal for said output video signal if said corresponding pixel is defective.

4,894,722

PROMPTER

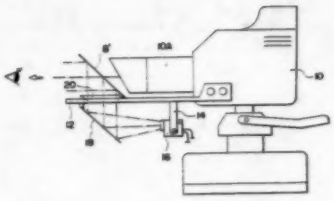
Nobuo Suzuki, Omiya, Japan, assignor to Fuji Photo Optical Co., Ltd., Saitama, Japan

Filed Nov. 28, 1988, Ser. No. 276,806

Claims priority, application Japan, Dec. 4, 1987, 62-306933

Int. Cl.[4] H04N *5/222*

U.S. Cl. 358—225 **5 Claims**



1. A prompter comprising:

a video camera for photographing materials such as broadcasting manuscripts and the like;

a projection unit disposed in front of a TV camera and including a transmissible liquid crystal display panel for displaying said materials as optical images in accordance with a video signal from said video camera, a drive circuit for driving said liquid crystal display panel, a light source for illuminating said liquid crystal display panel from behind, a group of condenser lenses for collecting light from said light source onto said liquid crystal display panel, and a group of projection lenses for enlargedly projecting the display images of said liquid crystal display panel;

a screen disposed in front of said TV camera for displaying the optical images that have been enlargedly projected by said group of projection lenses of said projection unit; and

a half mirror disposed in front of a taking lens of said TV camera and inclined obliquely for displaying said optical images on said screen.

4,894,723

IMAGE SENSING APPARATUS

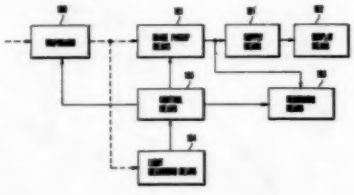
Kan Takaiwa, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 25, 1988, Ser. No. 185,551

Claims priority, application Japan, Apr. 30, 1987, 62-104537; Apr. 30, 1987, 62-104538

Int. Cl.[4] H04N *5/238*

U.S. Cl. 358—228 **34 Claims**



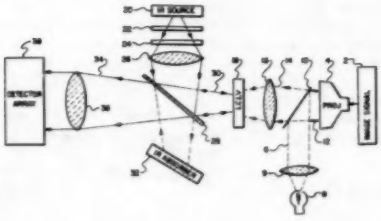
1. An image sensing apparatus comprising:

(A) image pickup means for photo-electrically converting incident light;

(B) a diaphragm for controlling the amount of light incident on said image pickup means;

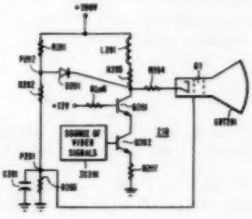
(C) display means for displaying an output of said image pickup means;
(D) recording means for recording the output of said image pickup means;
(E) light measuring means for measuring an ambient brightness; and
(F) control means, operable at times when said display means displays the output of said image pickup means and said recording means is inoperative, for setting said diaphragm to a predetermined aperture size, and for controlling an image pickup period of said image pickup means in accordance with the brightness measured by said light measuring means.

4,894,724
SYSTEM AND METHOD FOR PRODUCING A FLICKER-FREE VIDEO IMAGE
Murray S. Welkowsky, Chatsworth, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.
Filed Dec. 23, 1987, Ser. No. 137,543
Int. Cl.[4] H04N *5/33*
U.S. Cl. 358—231 **9 Claims**



1. A system for modulating an infrared (IR) or ultraviolet (UV) beam to present a substantially flicker-free video target image, comprising:
(a) a video projector, comprising:
(1) an electro-optic crystal having first and second opposed surfaces and an impedance sufficient to prevent substantial spreading of localized electric charges on the crystal, said crystal being at least partially transparent to a predetermined light waveband,
(2) a conductive grid adjacent to but spaced from said first crystal surface,
(3) means for applying a video voltage signal across the conductive grid and said crystal,
(4) an electron gun arranged to scan said first crystal surface with an electron beam in synchronism with said video voltage signal, the electron beam producing a conducting path between the conductive grid and the portion of the first crystal surface under the electron beam to transfer a localized charge to said crystal surface and induce in said crystal corresponding localized birefringence, the amount of said charge transfer being controlled by said video voltage signal on the conductive grid at the time of said transfer, the electron beam forming a video pattern of localized charges on said first crystal surface, and a corresponding pattern of localized birefringences in the crystal, as scanning proceeds in synchronism with said video voltage signal, and
(5) a mirror arranged to reflect back through the crystal light which is transmitted through the crystal from said second crystal surface,
(b) polarizing means for polarizing an input optical beam which includes at least part of said predetermined light waveband and is directed through the crystal from said second crystal surface, for analyzing the polarization pattern of a reflected beam reflected back through the crystal from said input optical beam, and for transmitting a video projector output beam which comprises a video pattern of said reflected beam, said video pattern corresponding to a polarization rotation pattern imposed upon the reflected beam by said pattern of localized birefringences, and
(c) a liquid crystal light valve (LCLV) positioned to receive said video projector output beam as a control input to the LCLV, and to modulate an IR or UV readout beam applied to the LCLV in accordance with the video pattern carried by the video projector output beam, said LCLV converting the video projector output beam to a spatial voltage pattern and modulating the IR or UV readout beam in accordance with any portions of the spatial voltage pattern which exceed a threshold voltage, and the video projector having differing WRITE and ERASE periods, at least one of which is longer than the frame period of the video target image, the identity of the longer period depending upon the voltage polarity applied to the conductive grid, wherein said means for applying the video voltage signal across the conductive grid and said crystal applies a voltage polarity to the conductive grid which produces a shorter WRITE period, said LCLV having a response time such that its spatial voltage pattern is below its threshold voltage at the end of an ERASE period from the video projector, thereby inhibiting the LCLV from modulating said applied IR or UV readout beam at such time even if the video projector output beam and the LCLV spatial voltage pattern are greater than zero.

4,894,725
BIASING CLAMP FOR A CRT
Gene K. Sendelweck, Indianapolis, Ind., assignor to RCA Licensing Corporation, Princeton, N.J.
Filed Mar. 15, 1988, Ser. No. 167,750
Int. Cl.[4] H04N *5/44, 5/68*
U.S. Cl. 358—243 **5 Claims**



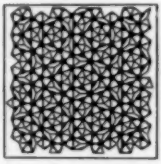
1. In a television receiver, apparatus, comprising:
a picture tube having a cathode element and a grid (G1) element; and
a kine driver circuit including,
an amplifier means having an input terminal for receiving video signals to be amplified, and an output terminal coupled to said cathode element, at which output terminal amplified signals and an output voltage level are developed, said picture tube being susceptible to periods of excessive beam current in response to said amplified signals and said output voltage level;
means for applying a bias voltage to said grid (G1) element; and
diode means coupled between said grid (G1) element and said cathode element and having a conductive state wherein said beam current is limited and having a non-conductive state, said diode means being responsive to said output voltage level at said cathode element for maintaining said bias voltage on said grid (G1) element at a level lower than said output voltage level at said cathode element.

4,894,726

METHODS AND APPARATUS FOR ELIMINATING MOIRé INTERFERENCE USING QUASIPERIODIC PATTERNS

Paul J. Steinhardt, Wynnewood, and Philip Taylor, Philadelphia, both of Pa., assignors to Trustees of the University of Pennsylvania, Philadelphia, Pa.

Filed Jul. 21, 1988, Ser. No. 222,201
Int. Cl.[4] H04N *1/00*
U.S. Cl. 358—298 21 Claims



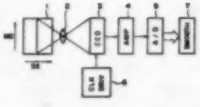
15. In a method of printing an image upon an object comprising the step of converting a continuous tone image into at least one half-tone image having areas to be substantially filled with color and areas to be substantially free from color, the improvement wherein said areas to be substantially filled with color and areas to be substantially free from color are arrayed substantially in accordance pattern comprising a plurality of identifiable elements, the intervals between said elements and the frequencies with which said elements appear being described by ratios which cannot be expressed as the ratio of two whole numbers.

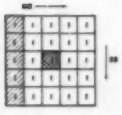
4,894,727

IMAGE PROCESSING SYSTEM AND METHOD

Tomio Sasaki, Tokyo, Japan, assignor to Ricoh Company, Ltd., Japan

Filed Oct. 17, 1988, Ser. No. 258,835
Claims priority, application Japan, Oct. 20, 1987, 62-262760; Nov. 9, 1987, 62-281069; Aug. 5, 1988, 63-194630
Int. Cl.[4] H04N *1/40*
U.S. Cl. 358—429 13 Claims





13. An image processing method of processing input data related to a dot image which is obtained by scanning a document repeatedly in a main scanning direction along a sub scanning direction, said image processing method comprising the steps of:

smoothing the density of a dot image based on a predetermined smoothing matrix so as to successively output smoothened picture element data which constitute an image data;

delaying the smoothened picture element data by a first predetermined time in the main scanning direction;

delaying the smoothened picture element data by a second predetermined time in the sub scanning direction;

successively averaging two picture element data having a mutual time difference equal to said first predetermined time in the main scanning direction to output first average values;

successively averaging two picture element data having a mutual time difference equal to said second predetermined time in the sub scanning direction to output second average values;

successively averaging said first and second average values to output third average values; and

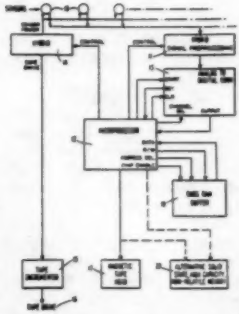
subjecting the third average values to a pseudo halftone process.

4,894,728

DATA ACQUISITION AND RECORDING SYSTEM

Robert M. Goodman, 7811 Mill Rd., Elkins Park, Pa. 19117

PCT No. PCT/US86/01385, § 371 Date Oct. 12, 1988, § 102(e) Date Oct. 12, 1988, PCT Pub. No. WO88/00384, PCT Pub. Date Jan. 14, 1988
Continuation-in-part of Ser. No. 706,022, Feb. 27, 1985, abandoned. This PCT application Jun. 27, 1986, Ser. No. 288,794
Int. Cl.[4] G11B *5/00, 5/09*
U.S. Cl. 360—6 26 Claims



1. A portable data acquisition and recording system capable of being carried on an ambulatory subject for monitoring selected conditions of the subject over a selected time period having a recording tape and power supply, the system comprising:

(a) sensor means in communication with the subject for sensing at least one selected parameter of the subject and having a sensor circuit for producing signals representing the parameter being sensed;

(b) an interface circuit connected with the sensor circuit for converting the signals originating at the sensor circuit into digital signals of a selected format;

(c) a recording head for recording digital signals on said recording tape in a limited area adjacent said recording head;

(d) tape drive means having a tape drive circuit for advancing the tape to permit recording of successive digital signals on said tape;

(e) a microprocessor for controlling system circuit opera-

tion, for processing signals and for enabling digital signals to be supplied to the recording head for recording onto the tape; and

(f) power control means associated with the system for continuously optimizing power usage of the system during subject monitoring, the power control means being connected to said circuits and energizing said sensor circuit to produce signals, and, in response to the signals produced by said sensor circuit, selectively preventing power from energizing any selected circuit of the system at time periods during monitoring when any such selected circuit is not required by said signals to perform functions requiring power usage and selectively enabling power to energize any selected circuit of the system at time periods during monitoring when any such selected circuit is required by said signals to perform a desired function requiring power usage.

4,894,729

PICTURE ELEMENT DATA GENERATING METHOD

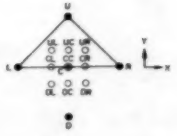
Noboru Murayama, Machida, and Koichi Suzuki, Yokohama, both of Japan, assignors to Ricoh Company, Ltd., Japan

Filed Sep. 28, 1987, Ser. No. 102,380

Claims priority, application Japan, Oct. 2, 1986, 61-235080; Oct. 7, 1986, 61-239919; Oct. 7, 1986, 61-239920

Int. Cl.[4] H04N *1/40*

U.S. Cl. 358—447 **13 Claims**



1. A picture element data generating method comprising the steps of:

extracting a noticeable pixel and a plurality of reference pixels from image data of first numbers(s) of gradation levels, said reference pixels being adjacent to said noticeable pixel;

generating a pixel positioned within a closed minimum polygon formed by a least number of line segments, said polygon being formed so as to include said noticeable pixel and said reference pixels as vertexes thereof or to include said reference pixels as vertexes and said noticeable pixel on a line segment thereof, a gradation level of said pixel being calculated by use of weighted gradation levels of said noticeable and reference pixels; and

repeating said generating step to generate a plurality of pixels of second number(s) of gradation levels around said noticeable pixel by forming a plurality of closed minimum polygons, each said minimum polygon including said noticeable pixel, so that the gradation of said image data can be represented by an increased number of gradation levels.

4,894,730

MANUALLY SWEEPING CONTACT SENSITIVE COPIER WITH IMAGE DATA MEMORY

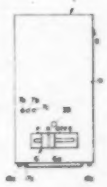
Nikio Yanagawa; Kenji Honda, and Hiroshi Okumura, all of Tokyo, Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan

Filed May 24, 1988, Ser. No. 197,989

Claims priority, application Japan, May 26, 1987, 62-128822; Apr. 27, 1988, 63-56895[U]

Int. Cl.[4] H04N *1/04*

U.S. Cl. 358—473 **13 Claims**



1. A hand-held manually sweepable apparatus, comprising:

housing means arranged to be manually sweepable across an original that has image data thereon;

image-data processing means provided in said housing means, for reading the image data from the original while said housing means is swept manually across the original;

memory means provided in said housing means, for storing the image data read by said image-data processing means;

touch-detecting means associated with said housing means, for detecting whether or not said housing means contacts the original and for generating a detection signal when said housing means contacts the original;

manual switching means associated with said housing means, for generating an ON-signal when turned on, and an OFF-signal when turned off;

signal-condition detecting means provided in said housing means, for detecting the detection signal output from said touch-detecting means and the ON-signal and the OFF-signal output said manual switching means, and for generating a start signal when both of the detection signal and the ON-signal are output, and for generating a stop signal in response to at least one of the two conditions wherein (1) no detection signal is output from said touch-detection means, and (2) the OFF-signal is output from said manual switching means, after the start signal is generated;

distance-detecting means associated with said housing means, for detecting when said housing means has been swept across the original for a first predetermined distance from when the start signal is generated by said signal-condition detecting means;

memory control means provided in said housing means, for controlling a writing operation of said memory means so as to start the writing operation of said memory means when said distance-detecting means detects that said housing means has been swept across the original for the first predetermined distance; and

invalidating means provided in said housing means, for invalidating a predetermined amount of image data last read from the original and stored in said memory means, when the stop signal is output from said signal-condition detecting means.

4,894,731

METHOD OF SHOOTING BY CAMERA INTEGRATED WITH VTR

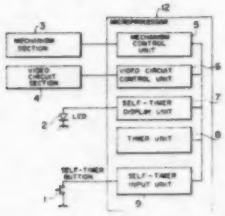
Seiko Nakasuna, Katsuta; Takeshi Kawarai; Shuji Toyoshima, both of Ibaraki; Hirotaka Kobayashi, Katsuta, and Takanori Nishiyama, Koganei, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 3, 1988, Ser. No. 151,965

Claims priority, application Japan, Feb. 6, 1987, 62-24511

Int. Cl.[4] H04N *5/782*

U.S. Cl. 360—9.1 **10 Claims**



1. A method of photographing by a VTR-integrated camera in which a VTR section with a recording function and a video camera section are integrally constituted, comprising the steps of:

setting said VTR section to a camera recording standby state;

supplying to a display section a repetitive signal for allowing said display section to be alternately repetitively lit on and off every first predetermined time by operating a self timer operating element;

calculating a total time after the supply of said repetitive signal to the display section was started, when said total time has reached a second predetermined time longer than said first predetermined time, supplying a light-on signal to the display section to thereby light on the display section, supplying an operation signal to said VTR section, cancelling said camera recording standby state, and thereby starting a recording; and

calculating a time after the recording was started, when said time has reached a third predetermined time longer than said first predetermined time, stopping the supply of said light-on signal to the display section to thereby light off the display section, stopping the supply of said operation signal to said VTR section, and thereby returning to said camera recording standby state.

4,894,732

PROGRAMMED REPRODUCTION SYSTEM FOR STILL PICTURE RECORDING/REPRODUCTION DEVICE

Tadashi Ueda, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Sep. 21, 1987, Ser. No. 98,828

Claims priority, application Japan, Sep. 20, 1986, 61-222740

Int. Cl.[4] H04N *5/78*

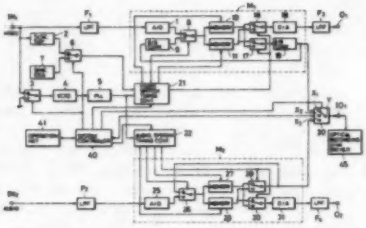
U.S. Cl. 360—10.1 **4 Claims**

1. A reproducing system in a still picture recording and reproduction device, comprising:

disk recording and reproducing means for selectively recording and reproducing data onto or from a designated recording position of a recording disk;

a video memory for storing data including video information, so that data reproduced from said recording disk by said disk recording and reproducing means are written into said memory and then repeatedly read out of said memory so as to be output to perform still picture reproducing in accordance with a user request;

means for selecting one of a first quantity and a second, different quantity of data in accordance with said user selection, from the data reproduced from said recording disk by said disk recording and reproducing means so as to be written into said video memory; and



means for repeatedly reading out of said video memory said data of the selected quantity in accordance with said user selection, wherein read-out speed and resolution achieved by reading out said first quantity differs from that achieved by reading out said second quantity.

4,894,733

TAPE WINDING METHOD AND MACHINE

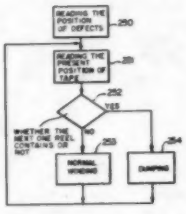
Toshiya Odaka, Tokyo, Japan, assignor to Otari Electric Company Ltd., Tokyo, Japan

Filed Mar. 14, 1988, Ser. No. 168,113

Claims priority, application Japan, Mar. 16, 1987, 62-61664

Int. Cl.[4] G11B *27/36;* **G01R** *33/12*

U.S. Cl. 360—31 **6 Claims**



1. A tape winding method for winding a tape supplied from a tape supply reel into an empty cartridge so that a completed magnetic tape cartridge can be obtained, comprising the steps of:

inspecting said tape for defects prior to winding said tape into said empty cartridge;

recording the results of said inspection concerning said defects of said tape; and

winding portions of said tape not containing any defects into said empty cartridge while those portions of said tape containing defects are discarded based upon said results of said inspection.

4,894,734

METHOD AND APPARATUS FOR CONSTANT DENSITY RECORDING

Al Fischler, San Jose, and Ross Wilson, Menlo Park, both of Calif., assignors to Maxtor Corporation, San Jose, Calif.

Filed May 15, 1987, Ser. No. 50,753

Int. Cl.[4] G11B *5/09*

U.S. Cl. 360—51 **5 Claims**

1. A circuit for reading and writing data with a read/write head at a plurality of constant frequency zones on a data storage disk comprising:

identifying means coupled to said read/write head for de-

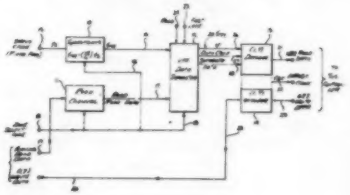
tecting a first identification signal identifying a track of said storage disk and assigning one of a plurality of zone select codes to said track, each zone select code corresponding to one of said constant frequency zones;

clock signal generating means coupled to said zone select code and to a first clock signal having a first frequency, said clock signal generating means outputting a second clock signal having a second frequency dependent on said zone select code such that a different frequency is produced for each said constant frequency zones;

data separating means coupled to said second clock signal for defining data recovery windows for separating data during a read operation, said data separating means outputting a data clock for controlling the frequency of a write operation;

a read channel coupled to said read/write head and to said data separating means for converting analog data signals into digital data signals;

encoding means coupled to said data separating means for



writing data at a frequency corresponding to said second frequency;

decoding means coupled to said data separating means for reading data from said constant frequency zones of said data storage disk at said second frequency;

said zone select code comprising a digital code having a numerical value dependent on said constant frequency zone;

said clock signal generating means comprising means for multiplying said first clock signal by a weighting factor corresponding to said numerical value of said zone select code;

said data separating means comprising a variable frequency oscillator (VFO) and said data separating means may be selectively coupled to said clock signal generating means and said read channel;

said data separating means further including a digital to analog converter coupled to said zone select code, said digital to analog converter having an output defining a center frequency of a voltage controlled oscillator (VCO).

4,894,735

DISK DRIVE HOUSING STRUCTURE

Mikio Takahashi, Odawara; Yoshihiro Moribe; Hideo Mackawa, both of Chigasaki; Takaaki Abo, Odawara; Yasuo Yamamoto, Odawara; Shigeo Nakamura, Odawara, and Osamu Beppu, Odawara, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 13, 1988, Ser. No. 206,270

Claims priority, application Japan, Jun. 26, 1987, 62-157632

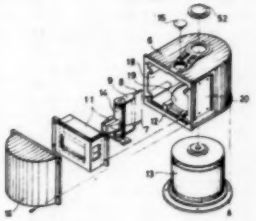
Int. Cl.[4] G11B *5/012*

U.S. Cl. 360—97.01 **10 Claims**

1. A housing structure for a disk drive that includes a disk for recording information, a rotatable spindle shaft supporting said disk, a transducer for writing and reading information to and from said disk and a transducer positioner positioning said transducer to a desired position on said disk, comprising:

a disk housing having parts for supporting both ends of said spindle shaft and for enclosing said disk, spindle shaft, transducer and transducer positioner, said disk housing comprising a first housing and second housing,

said first housing being separated from said second housing along a plane substantially in parallel with said spindle shaft; and wherein said first housing includes supports for both ends of said spindle shaft, and one of said supports



being at a first aperture greater than a plane size of the disk for enabling insertion of said disk with said spindle shaft supporting said disk into the first housing, and the end of said spindle shaft corresponding to said first aperture being supported by a supporting member fixed to said first aperture.

4,894,736

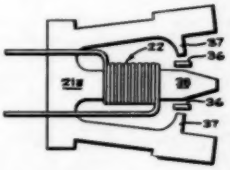
BENDABLE E-SHAPED TRANSDUCER

Gregory A. Orton, Fremont, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Filed Oct. 30, 1987, Ser. No. 116,110

Int. Cl.[4] G11B *5/127, 5/17*

U.S. Cl. 360—126 **16 Claims**



1. An electromagnetic transducer comprising: a prewound electrically conducting coil; and

a core member constructed of laminations all parallel to a predetermined plane of laminations being bonded to one another and being formed of material that is magnetically permeable and bendable but inelastic;

said core member being of the E-shape type having one middle and two outer pole portions defining two magnetic circuits, each including a transducing gap of low magnetic permeability between the middle and respective outer portions, said coil linked with the middle portion and passing around a portion of the outside of the coil in said plane of lamination, each of said gaps having a width dimension orthogonal to said plane of lamination, and a length dimension in the plane of lamination, and in the direction of motion of said transducer with respect to a magnetic recording medium, said gaps being spaced along the tape direction of motion; and

said pole piece portions having at least one critical relationship dimension between the middle pole piece portion and the oppositely facing faces of the outer pole piece portions that is too small to permit non-distorting disassembly of said core and coil.

4,894,737

MAGNETIC HEAD APPARATUS HAVING PROJECTIONS EXTENDING FROM AT LEAST A FRONT SIDE THEREOF

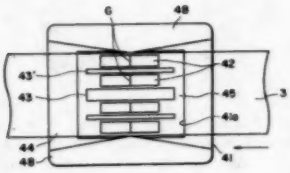
Junji Hamana, Hanno; Shinichi Hara, Fukaya, and Makoto Miyagi, Chichibu, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 2, 1987, Ser. No. 127,947

Claims priority, application Japan, Dec. 5, 1986, 61-UM186790[U]; Dec. 12, 1986, 61-294732; Dec. 25, 1986, 61-UM198483[U]; Jan. 23, 1987, 62-012214; Jul. 31, 1987, 62-189989

Int. Cl.[4] G11B *15/60, 5/105*

U.S. Cl. 360—130.21 **16 Claims**



1. A magnetic head, comprising:

a magnetic core having a first contact face for contacting a recording medium;

a fixing material surrounding said magnetic core and having a second contact face for contacting the recording medium; and

a case housing said magnetic core and said fixing material, provided with an aperture exposing said first contact face of said magnetic core and said second contact face of said fixing material and provided further with a pair of projecting members, each of said projecting members projecting from a position adjacent said aperture and outside a path of the recording medium,

wherein said projecting members on said case project from at least one of said first contact face of said magnetic core and said second contact face of said fixing material a distance which is within a range of 0.01 mm to 0.5 mm.

4,894,738

DISK STORAGE DRIVE

Dieter Elsasser, St. Georgen; Johann von der Heide, Schramberg, and Heinrich Cap, Peterzell, all of Fed. Rep. of Germany, assignors to Papst-Motoren GmbH & Co. KG, St. Georgen, Fed. Rep. of Germany

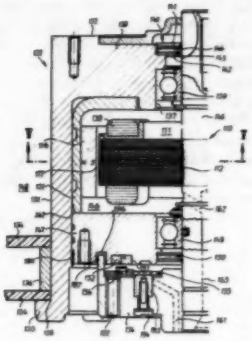
Continuation-in-part of Ser. No. 38,049, Apr. 14, 1987, Continuation-in-part of Ser. No. 767,671, Aug. 21, 1985, Pat. No. 4,658,312, Continuation of Ser. No. 412,093, Aug. 27, 1982, abandoned. This application Jun. 2, 1988, Ser. No. 201,736

Claims priority, application Fed. Rep. of Germany, Sep. 7, 1981, 3135385

Int. Cl.[4] G11B *5/012*

U.S. Cl. 360—97.1 **18 Claims**

1. A disk memory drive comprising: a brushless drive motor having an internal space defined therein and a stator including winding means defining magnetically active parts of the drive motor and having a given axial extension, the motor having an outer rotor with an open end coaxially encircling the stator and a substantially cylindrical air gap defined between the stator and the rotor, the rotor including a hub and including permanent magnet means having a predetermined axial extension fixedly connected therewith for magnetic interaction with said winding means; a disk mounting section provided on the hub for accomodating at least one storage disk located in a clean chamber surrounding said rotor, the mounting section along its axial length being adapted to extend through a central aperture of the storage disk, the winding means and the magnet means interacting therewith being disposed for at least half of the axial extension thereof within a space surrounded by the disk mounting section of the hub; and upper and lower bearing means having inner and outer races on a stationary shaft rotatably mounting the rotor and the hub on the shaft, the rotor also including rotational position indicator means interacting with stationary rotational position sensor means for determining the



rotational position of the rotor, the internal space of said motor, which includes the internal portions thereof with the bearing means, being sealed off against the clean chamber containing the disk, and a disk-shaped ring member being located with precision at the open end of the rotor between the inner circumference of the rotor and the outer race of the lower bearing means.

4,894,739

DISC RECORDING AND/OR REPRODUCING APPARATUS

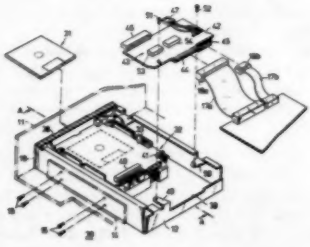
Ko Kobayashi, Higashikurume, Japan, assignor to Teac Corporation, Japan

Continuation of Ser. No. 67,928, Jun. 29, 1987, abandoned. This application Feb. 3, 1989, Ser. No. 307,215

Claims priority, application Japan, Jul. 4, 1986, 61-102071[U]

Int. Cl.[4] G11B *5/012*

U.S. Cl. 360—97.02 **1 Claim**



1. A magnetic disc recording and/or reproducing apparatus for cooperation with an external information processing system for recording and/or reproduction of digital data on and from a flexible magnetic disc comprising:

a frame having a size substantially identical to a standardized frame used in a first standardized magnetic recording and/or reproducing apparatus for accommodating a first recording/reproducing unit for recording and/or reproducing a digital data on and from a first standardized flexible magnetic disc having a first standardized diameter, said frame being adapted to be mounted on a body of

the external information processing system in a detachable manner;

a second recording/reproducing unit mounted on said frame for recording and/or reproducing a digital data on and from a second standardized flexible magnetic disc having a second standardized diameter smaller than the first standardized diameter, said second recording/reproducing unit having a second size substantially smaller than the size of the first recording/reproducing unit;

a front panel closing a front end of the frame and having an inserting opening with a size so as to allow insertion of said second standardized flexible magnetic disc therethrough; and

a connector mounted on a rear end of the second recording-/reproducing unit, said connector having a design identical to a standardized connector used in the first standardized apparatus; and

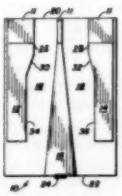
an intervening member connected to said rear end of the second record/reproducing unit, said intervening member having a size measured perpendicularly to the front panel such that an overall size of the second recording/reproducing unit and the intervening member connected to the second recording/reproducing unit becomes substantially identical to that of the first recording/reproducing unit when measured perpendicularly to the front panel, said intervening member carrying a socket corresponding to said connector at a first side making contact with the rear end of the second recording/reproducing unit and a second connector on a second side opposite to said first side, and electrically connecting the second recording/reproducing unit to the external information processing system.

4,894,740

MAGNETIC HEAD AIR BEARING SLIDER

Devendra S. Chhabra; Dien Le Van, and Henry S. Nishihira, all of San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 28, 1988, Ser. No. 250,686
Int. Cl.[4] G11B *5/60, 21/21*
U.S. Cl. 360—103 **14 Claims**



1. A magnetic disk recording system comprising:

a magnetic recording medium having a recording surface;

a magnetic transducer and an air bearing slider supporting said transducer;

head arm means for supporting said air bearing slider with said magnetic transducer closely adjacent to the recording surface of said magnetic recording medium;

accessing means for supporting said head arm means and for moving said head arm means relative to the recording surface of said magnetic recording medium;

said air bearing slider having leading and trailing ends and an air bearing surface;

side rails disposed along the sides of said air bearing surface of said air bearing slider, said side rails being substantially coplanar and extending from the leading end of said slider part way to the trailing end of said slider, said side rails having a tapered section formed on the air bearing surface at said leading end, each said side rail having a width measured normal to the leading to trailing dimension of said slider which does not substantially exceed the width of said side rails at said leading end of said slider; and

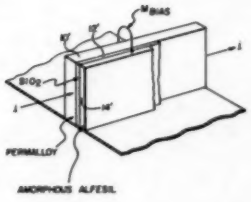
a center rail disposed along the central region of said air bearing surface, said center rail being separated from said side rails by recessed. Areas which extend from said leading end to said trailing end of said slider, said center rail having a taper section at said leading end, said center rail having a width measured normal to the leading to trailing dimension of said slider which is small at said leading end and which is greatest at said trailing end of said slider whereby said slider is positioned adjacent said magnetic recording medium in an orientation having a predetermined pitch angle and a predetermined spacing with respect to said moving magnetic recording medium in which the minimum spacing between said slider and said magnetic medium occurs at the trailing end of said slider.

4,894,741

MAGNETO-RESISTIVE HEAD WITH IMPROVED SENSITIVITY

William W. French, Cardiff-by-the-Sea, Calif., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed May 6, 1988, Ser. No. 191,087
Int. Cl.[4] G11B *5/30*
U.S. Cl. 360—113 **4 Claims**



1. In a magneto-resistive head of the type having

a. a field-responsive sense film of magnetic material adapted to carry a sense current,

b. a relatively electrically non-conductive film layered with said sense film of magnetic material,

c. a magnetic biasing layer of magnetic material covering said relatively electrically non-conductive film, the improvement wherein said magnetic biasing layer has a resistivity substantially greater than the resistivity of said sense film, and

d. said relatively electrically non-conductive film is less than 50 Angstroms in thickness.

4,894,742

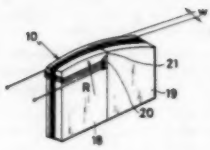
THIN-FILM LAMINATED MAGNETIC HEADS OF FE-SI-AL ALLOY

Kazuhiro Saito, and Taiichi Mori, both of Toda, Japan, assignors to Nippon Mining Company, Limited, Tokyo, Japan

Filed Oct. 3, 1986, Ser. No. 915,299
Claims priority, application Japan, Oct. 7, 1985, 60-223415
Int. Cl.[4] G11B *5/147*
U.S. Cl. 360—126 **3 Claims**

1. A thin-film laminated magnetic head comprising a pair of half blocks which are mated and bonded through a non-magnetic gap spacer, at least one of the half blocks formed with a groove for receiving coil winding, each of said half blocks having a pair of opposed substrates, and alternately laminated Fe-Si-Al alloy films and non-magnetic insulating films therebetween and entrapping in each alloy film an amount of argon ranging between about 0.01 to about 0.3 wt % based upon the

weight of the alloy film, so that internal stresses in said alloy films are substantially zeroed said substrates having a thermal



expansion coefficient lower than that of said Fe-Si-Al alloy films.

4,894,743

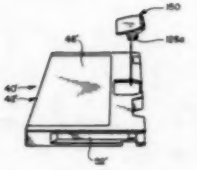
REPLACEABLE CLEANER/DRIVE MEMBERS FOR A TAPE DRIVE MACHINE

Eivind Clausen, Bellingham, Wash., assignor to Allsop, Inc., Bellingham, Wash.

Continuation-in-part of Ser. No. 818,120, Jan. 10, 1986, Pat. No. 4,816,952. This application May 10, 1988, Ser. No. 192,197

Int. Cl.[4] G11B *5/41*

U.S. Cl. 360—128 **11 Claims**



1. An apparatus to perform a cleaning operation on a machine which receives data from and/or imparts data to a magnetic tape, where the machine comprises:

a. a structure defining an operation location to receive a tape cassette, said operating location having a front area, a rear area and first and second side areas;

b. a read and/or write head located at the front area, with the head having a rearwardly facing operating surface, positioned to operatively engage a magnetic tape in the tape cassette;

c. a drive system comprising a drive member to move the magnetic tape by the head;

said apparatus comprising:

a. a main housing having a configuration to fit within said operating location in an operating position, said main housing having a forward portion, a rear portion, first and second side portions, a center portion, and a longitudinal center axis extending from the front portion, through the center portion to the rear portion;

b. a cleaning member mounted in said main housing to be movable on a cleaning path to clean said head;

c. drive means positioned in said housing to operatively engage said drive member so as to be driven thereby, to move said cleaning member on said cleaning path;

d. a first drive cartridge adapted to be removably mounted in said main housing at a cartridge location and having a drive element to form a drive connection between said drive member and said drive means to cause the cleaning member to move on said cleaning path;

e. a second cleaning cartridge adapted to be removably mounted in said main housing at said cartridge location in place of said first cartridge and having a cleaning pad means to engage said drive member to clean the drive member.

4,894,744

INFORMATION HANDLING AND CONTROL SYSTEMS, AND METHODS OF TESTING THE CONDITION OF ELECTRICAL LOADS IN SUCH SYSTEMS

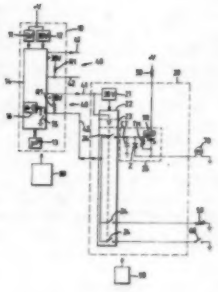
Kevin T. Talbot, Lichfield, England, assignor to Sulplex Limited, England

Filed Sep. 6, 1988, Ser. No. 240,678

Claims priority, application United Kingdom, Sep. 21, 1987, 8722195

Int. Cl.[4] H02H *3/20*

U.S. Cl. 361—91 **8 Claims**



1. An information handling and control system comprising:

(a) a power switch provided in a local unit and having a control electrode to control a high current to a load;

(b) a low current signalling link provided between the local unit and a remote intelligent unit;

(c) a capacitor provided in the local unit connected to the power switch control electrode;

(d) means provided in the local unit for connecting the capacitor to the signalling link during a time slot assigned to the power switch in successive frame periods;

(e) drive voltage means provided in the intelligent unit for applying a first or a second drive voltage within a said assigned time slot respectively to charge or discharge said capacitor to a high or a low voltage value sufficient respectively to turn the power switch on or off, the capacitor maintaining the power switch continuously on or continuously off between successive frame periods when the load is in normal condition;

(f) power switch protection means connected to the power switch and to the capacitor, the protection means being non-conductive when the load is in normal condition and becoming conductive when the power switch is on with the load in short-circuit condition, such that when the protection means is conductive the capacitor discharges to said low voltage value via the protection means and the power switch turns off; and

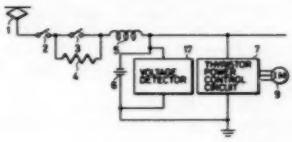
(g) detection means provided in the intelligent unit which are operable to detect the condition of the capacitor at a time in a selected said assigned time slot when the capacitor will be at said low voltage value only if the load is in a short-circuit condition and hence to detect whether or not the load is in short-circuit condition.

4,894,745

METHOD AND APPARATUS FOR PROTECTING AGAINST SEMICONDUCTOR POWER CONTROL FAILURE

Eiji Akagawa; Hideo Obi, and Yumiko Asano, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 16, 1986, Ser. No. 852,486
Claims priority, application Japan, Apr. 16, 1985, 60-83020
Int. Cl.[4] H02H 7/09
U.S. Cl. 361—42 6 Claims



1. In a power control, circuit including an electric power control device which is operable to control the application of power from a D.C. source through a current collector to a driving motor of an electric train; the circuit including, connected in a series circuit between the current collector and the power control device equipment, a first switch, a parallel circuit of a normally open second switch and a resistor, and an inductor, and also including a capacitor connected to the series circuit, said capacitor, when said first switch is closed, being charged through a charging path, consisting of said first switch, said resistor and said inductor, to a charge voltage in a predetermined time interval set by the time constant of the charging path, and after the predetermined time interval said second switch being closed and subsequently said power control device being operated to apply power to the driving motor;

a method of protecting said power control device comprising the steps of;

determining for the capacitor a reference charge voltage which is lower than the lowest value in a range of voltage variation of said D.C. source;

detecting the voltage on the capacitor during the predetermined time interval; and

if the detected voltage does not reach said reference charge voltage during said predetermined time interval maintaining second switch in an opened state.

4,894,746

LAMINATED CAPACITOR WITH FUSE FUNCTION

Susumu Mori, and Katuhiko Maruta, both of Kyoto, Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Jun. 2, 1988, Ser. No. 201,609
Claims priority, application Japan, Jun. 6, 1987, 62-141922; Jun. 6, 1987, 62-141923
Int. Cl.[4] H01G 1/11, 4/10
U.S. Cl. 361—275 5 Claims

1. A laminated capacitor comprising:

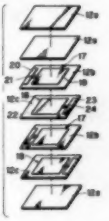
a dielectric laminated structure including a plurality of dielectric layers and having first and second end surfaces;

a first set of internal electrodes each positioned at an interface between a respective pair of adjacent dielectric layers and each comprising a first capacitance forming portion and a first external connection portion electrically connected to said first capacitance forming portion and extending to said first end surface;

a second set of internal electrodes each positioned at respective interfaces between adjacent pairs of dielectric layers, such that each of said dielectric layers is held between one of said second set of internal electrodes and an adjacent one of said first set of internal electrodes, and each of said second set of internal electrodes comprising a second capacitance forming portion opposed to said first capacitance forming portion and a second external connection portion electrically connected to said second capacitance forming portion and extending to said second end surface;

first and second external electrodes formed on said first and second end surfaces, respectively, and electrically connected respectively to the first and second external connection portion;

each electrode of each of said first and said second sets of



internal electrodes comprising a fuse portion which electrically interconnects said capacitance forming portion and said external connection portion, said fuse portion being adapted to be melted earlier than said capacitor forming portion and said external connection portion by the Joule heat produced when a current higher than a predetermined value flows through the fused portion; and

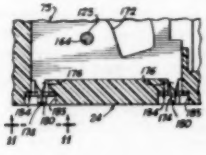
said fuse portion, said capacitance forming portion and said external connection portion are all positioned between said adjacent pair of dielectric layers.

4,894,747

SIDE PLATE TAPERED TWIST TAB FASTENING DEVICE FOR FASTENING SIDE PLATES TO THE BASE

John K. Livesey, Carnegie, and Alfred E. Maier, Beaver Falls, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 12, 1988, Ser. No. 256,880
Int. Cl.[4] H02B 1/04
U.S. Cl. 361—376 11 Claims



1. A circuit breaker including a housing, a molded base having an aperture, an operating mechanism, a pair of separable main contacts and a pair of side plates for carrying a portion of said operating mechanism, said side plates including means for attachment to said molded base comprising:

one or more twist tabs extending downwardly from a bottom edge of said side plate, each twist tab having a shank portion, an enlarged head portion and a tapered portion therebetween; and

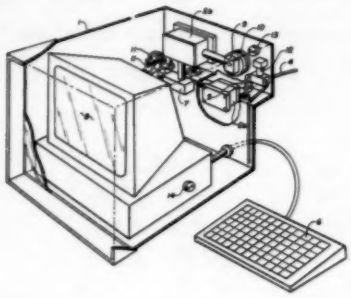
one or more spin plates, each spin plate having a slot for receiving said tapered portion of said twist tabs and adapted to be disposed adjacent said molded base such that said slot is aligned with said aperture.

4,894,748

CONTROL TERMINAL FOR HAZARDOUS LOCATIONS

Henry Shefet, 1425 Montfort Dr., Harrisburg, Pa. 17110

Filed Dec. 19, 1988, Ser. No. 286,533
Int. Cl.[4] H05K 7/00
U.S. Cl. 361—380 10 Claims



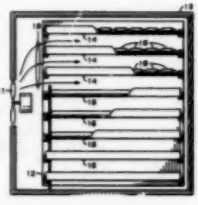
1. In an electronic control terminal system for use in hazardous atmospheres or atmospheres which are deleterious to electronic equipment, the combination comprising an enclosure pressurized with air or inert gas, through a normally open solenoid valve, purge check valves equipped with flame and spark suppressors, a mechanically operated low pressure cut-out switch which operates at a positive gauge pressure, a mechanically operated gas demand switch which operates at a gauge pressure between 3 and 5 inches of water column, an explosion-proof flow switch which assures a sufficient flow rate to purge the enclosure in the desired time, a purge timer, an internal atmospherically isolated explosion-proof junction box containing all components which are electrically active prior to purge completion except for the explosion-proof flow switch, an external atmospherically isolated explosion-proof junction box containing all external power terminals, a PAC seal connection between the external explosion-proof junction box and local electrical power conduit, and explosion-proof union for interconnection between the external and internal explosion-proof junction boxes, a cathode-ray tube monitor and data processing unit, a first overtemperature purge control switch, a second overtemperature terminal power cut-off switch and a pendant intrinsically safe keyboard.

4,894,749

OPTION SLOT FILLER BOARD

Gary W. Elko, Summit, N.J.; Paul Howard, Hinsdale, Ill., and Daniel A. Quinlan, Andover, Mass., assignors to AT&T Information Systems Inc American Telephone and Telegraph Company, New York, N.Y.; AT&T Information Systems, Morristown and AT&T Bell Laboratories, Murray Hill, both of, N.J.

Filed Aug. 31, 1987, Ser. No. 91,244
Int. Cl.[4] H05K 7/20; H02K 5/24
U.S. Cl. 361—383 6 Claims



1. An arrangement for use with an electronic apparatus providing a plurality of slots, each slot for connection to the apparatus of an optional circuit package,

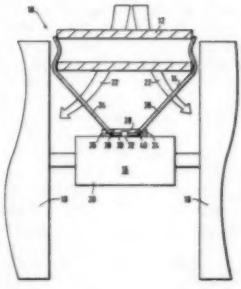
the arrangement for connecting to a slot of the plurality of slots instead of the optional circuit package, the arrangement being a dummy optional circuit package having protrusions extending therefrom toward adjacent slots across a direction of coolant flow to block the flow of the coolant between two adjacent slots when the arrangement and an identical arrangement are connected one to each of the two adjacent slots.

4,894,750

HOLDER FOR DISPOSING AN ELECTRICAL COMPONENT ON A HOUSING

Joachim Schulz, Amorbach, Fed. Rep. of Germany, assignor to Aurora Konrad G. Schulz GmbH & Co., Mudau/Odenwald, Fed. Rep. of Germany

Filed Aug. 31, 1988, Ser. No. 239,182
Claims priority, application Fed. Rep. of Germany, Sep. 1, 1987, 8711826[U]
Int. Cl.[4] H05K 7/20, 7/02
U.S. Cl. 361—383 17 Claims



1. A holder disposing an electrical component, especially a cylindrical component such as a resistor which is adapted to receive an air flow, on a housing, the improvement wherein:

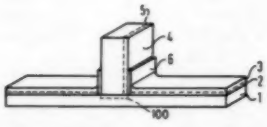
said holder is elongated, with that portion which the air flow would first reach having a round cross-sectional shape, said holder furthermore having an essentially U-shaped central portion and two ends, with said ends extending into openings of said component, and with said central portion being held in guide means of said housing.

4,894,751

PRINTED CIRCUIT BOARD FOR ELECTRONICS

Ulrich Wehnelt, Soecking, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed May 20, 1988, Ser. No. 197,602
Claims priority, application Fed. Rep. of Germany, Aug. 14, 1987, 68711105
Int. Cl.[4] H05K 1/18
U.S. Cl. 361—398 21 Claims



1. A printed circuit board system, comprising:

a meltable carrier having electronic components mounted thereon, the components each having a bottom portion and a conductive coating at connecting zones at sides of the components adjacent the bottom portion;

the carrier having interconnects thereon formed of a solderable metal, said interconnects being positioned at least at a surface of said carrier at which said interconnects connect to the electronic components; and

the electronic components being partially sunk at the bottom portion into a melted portion of the carrier for mechanical stability and being connected to the interconnects at said surface by said solderable metal, a flowed and previously melted portion of said solderable metal being in contact with the conductive coating of the components.

4,894,752

LEAD FRAME FOR A SEMICONDUCTOR DEVICE

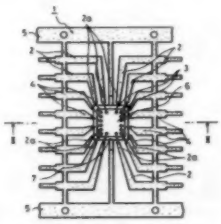
Akihiko Murata, and Toshihiko Shimada, both of Nagano, Japan, assignors to Shinko Electric Industries, Co., Ltd., Nagano, Japan

Filed Jul. 14, 1988, Ser. No. 218,882

Claims priority, application Japan, Jul. 14, 1987, 62-175481

Int. Cl.[4] H05K *5/02*

U.S. Cl. 361—421 **7 Claims**



1. A lead frame for mounting a semiconductor chip having a plurality of connecting terminals, comprising:

upper and lower guide rails;

a die pad on which the semiconductor chip is mountable;

a plurality of leads coupled to the upper and lower guide rails and being disposed around said die pad;

each of said leads having a tip defining a wire bonding area which is connectable with a wire to a corresponding connecting terminal of said semiconductor chip when mounted on said die pad; and

a thin silver film plating having a thickness in a range between a molecular level to about 0.1 μm, covering the entire lead frame.

4,894,753

ELECTRICAL CIRCUITRY SUPPORT APPARATUS

Brian C. Wadell, Reading, and Bernard M. Cuddy, Cambridge, both of Mass., assignors to Teradyne, Inc., Boston, Mass.

Filed Sep. 9, 1988, Ser. No. 243,068

Int. Cl.[4] H05K *9/00*

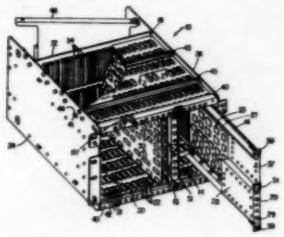
U.S. Cl. 361—424 **15 Claims**

1. Electrical circuitry support apparatus comprising

a card cage having two sets of facing slots for removably receiving circuit boards in a region between said two sets of slots, said card cage employing a ground bar extending along an opening to said region, and

a plurality of circuit boards in said slots, each board being received in one slot of one set and one slot of the other set,

at least one circuit board being a high-frequency board assembly including a shielded enclosure on a first side of said high frequency board assembly, said high-frequency board assembly containing a high-frequency device, the enclosure providing shielding inhibiting transmission of high-frequency signals from or to said device, said high-frequency board assembly having an ear that extends from



said high-frequency board assembly and is electrically connected to said ground bar.

4,894,754

UNIT FOR FIXING AND PIVOTING AN OPTICAL ASSEMBLY

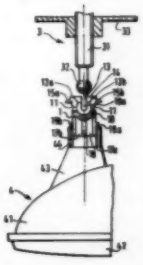
Alain Levilain, Paris, France, assignor to Valeo Vision, Bobigny Cedex, France

Filed Dec. 12, 1988, Ser. No. 284,057

Claims priority, application France, Dec. 14, 1987, 87 17407

Int. Cl.[4] B60Q *1/06;* **F21V** *3/18*

U.S. Cl. 362—66 **18 Claims**



9. In a headlamp assembly for an automotive vehicle having a control screw held by a fixed support, said control screw having a connecting ball, a unit for fixing and pivoting said head lamp assembly to said control screw comprising:

a socket moulded from plastics material and having a concave seat adapted to receive said ball of said screw, said socket comprising a first part having a plurality of arms, each said arm having a concave internal shape, said arms extending substantially in the direction of and around the longitudinal axis of said socket, and each said arm separated from an adjacent said arm by a slot in said first part of said socket extending substantially in the direction of said longitudinal axis, and a second part, said first and said second parts connected by a live hinge, said arms of said first part pivotable about said live hinge, and said second part having a substantially cylindrical formation connected to said second part of said socket;

wherein said head lamp assembly includes a housing and said substantially cylindrical formation is adapted to fit into said housing to connect said socket to said head lamp assembly.

4,894,755

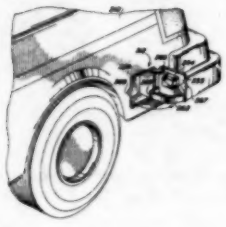
RETRACTABLE TIRE CHANGE LIGHTS FOR AUTOMOTIVE VEHICLES

Daniel E. Chandler, P.O. Box 1893, Cave Creek, Ariz. 85331

Continuation-in-part of Ser. No. 184,937, Apr. 22, 1988, Pat. No. 4,802,069. This application Oct. 21, 1988, Ser. No. 260,530

Int. Cl.[4] B60Q *1/32*

U.S. Cl. 362—83 **13 Claims**



1. A tire-changing safety assembly comprising in combination:

(a) an automotive vehicle having a body and a plurality of tires, each of said tires being mounted for rotation in a different wheel well in said body;

(b) a plurality of cut-outs formed in the body of said vehicle, each of said cut-outs being formed proximate a different one of said wheel wells; and

(c) a plurality of tire change lights, each of said lights being mounted in a different one of said cut-outs, each of said lights comprising:

(i) a pivotable door mounted for swinging movement from a closed position covering one of said cut-outs to an open position extending outwardly from said vehicle;

(ii) a light source mounted on the inner surface of said pivotable door; and

(iii) a box-like casing mounted in the interior of said cut-out for isolating said light source from the underside of said vehicle.

4,894,756

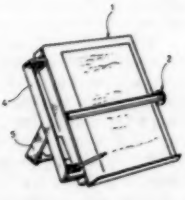
DIVERSIFIED BOOKREST

Boo Lin Jan, No. 78, BO I Street, Shinchu City, Taiwan

Filed Sep. 23, 1988, Ser. No. 248,100

Int. Cl.[4] A47B *23/06*

U.S. Cl. 362—97 **1 Claim**



1. A diversified bookrest comprising: a transparent rectangular board having corner positioners; a mounting frame having a first sub-frame and a second sub-frame which is pivotally attached to said first sub-frame and held attached behind said rectangular board and includes vertically spaced mounting elements; a fluorescent lamp assembly capable of being selectively mounted on one of said mounting elements; a rule secured to said positioners and capable of being 3-dimensionally adjusted with respect to said board; a pen stand secured to said positioners for being placed alongside one side of said rectangular board; a positioning rod secured to said positioners; a mounting piece slidably fixed on said positioning rod, and having a hole receiving therein a ball engaging with said positioning rod, a spring and a threaded piece capable of being rotated to urge said spring against said ball; and a securing rod slidably and rotatably mounted on said mounting piece and securing thereto said rule.

4,894,757

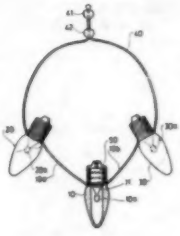
ILLUMINATION APPARATUS FOR ORNAMENTS

John D. Frusha, 12539 N. Oakhills Parkway, Baton Rouge, La. 70810, and Sam S. Lee, 12F., Tun HWA S. Rd., Taipei, Taiwan

Filed Aug. 22, 1988, Ser. No. 235,025

Int. Cl.[4] F21L *15/08*

U.S. Cl. 362—104 **10 Claims**



1. An illumination apparatus, comprising:

a plurality of lamps;

a plurality of housings each encasing at least one of said lamps;

at least one of said housings having a tubular neck portion with a threaded wall;

a printed circuit board mounted in said tubular neck portion for electrical connection to at least one said lamp;

at least one battery means provided in said neck portion, with means for electrical connection to said printed circuit board;

a cap enclosing said neck portion and including switch means for switching the electrical power of said battery to said printed circuit board; and

electrical connecting means for electrically connecting said printed circuit board to the other of said lamps.

4,894,758

LIGHTING COVER AND COMBINATION FOR CORNER INSTALLATION

John M. O'Toole, Culver City, Calif., assignor to Theresa A. Hasty and Donald B. Hasty, both of Los Angeles, Calif.

Filed Sep. 5, 1989, Ser. No. 402,764

Int. Cl.[4] F21S *1/02*

U.S. Cl. 362—147 **22 Claims**

1. A lighting fixture for installation in a corner between a first wall and a second wall, comprising:

a light cover for placement in the corner between the first wall and the second wall, said light cover being made of a rectangular segment of material which is bent along a diagonal thereof at approximately a ninety degree angle, said light cover being made of material which will allow light to pass therethrough;

a socket assembly for holding a lamp in position under said

light cover in the corner between the first wall and the second wall; and

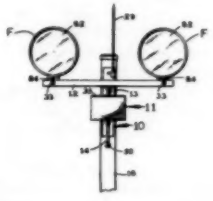
means for mounting said light cover in position in the corner between the first wall and the second wall.

4,894,759

PRE-WIRED UNITARY SUPPORT ASSEMBLY FOR FLOODLIGHTS

Steven L. Siems, 1491 S. W. 21st Ave., Fort Lauderdale, Fla. 33312

Filed Jan. 19, 1989, Ser. No. 298,700
Int. Cl.[4] F21S *1/10*
U.S. Cl. 362—250 13 Claims



1. A pre-wired unitary support assembly for mounting floodlights on a pole comprising:

a vertically elongated back member attachable to the pole;

an electrical junction box rigidly affixed to said back member, said junction box having a bottom opening and a top opening therein;

a tubular wiring sleeve extending down from said bottom opening in the junction box;

a horizontally elongated hollow cross arm rigidly affixed to said back member above said junction box, said cross arm having a bottom opening therein above said top opening in the junction box, said cross arm having laterally spaced openings therein, and wiring fittings on said cross arm at said laterally spaced openings therein;

tube means attached at its lower end to said junction box and at its upper end to said cross arm, said tube means extending from said top opening in the junction box up to said bottom opening in the cross arm;

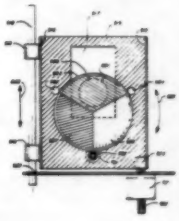
and electrical wiring extending from behind said wiring fittings on said cross arm along the inside of said cross arm to said bottom opening therein and down through said tube means and through said top opening in the junction box into the inside of the junction box.

4,894,760

ADDITIVE COLOR-MIXING LIGHT FIXTURE EMPLOYING A SINGLE MOVEABLE MULTI-FILTER ARRAY

Michael Callahan, 40 W. 94th St., New York, N.Y. 10025

Continuation-in-part of Ser. No. 66,790, Jun. 25, 1987, Pat. No. 4,797,795, which is a continuation of Ser. No. 750,873, Jul. 1, 1985, Pat. No. 4,697,227, which is a continuation of Ser. No. 443,127, Nov. 19, 1982, Pat. No. 4,527,198. This application Sep. 28, 1988, Ser. No. 250,316
Int. Cl.[4] F21V *9/00*
U.S. Cl. 362—293 3 Claims



1. A color-mixing lighting fixture, said lighting fixture producing a beam suitable for entertainment lighting, and capable of the remote adjustment of the apparent color of said beam, said lighting fixture comprising:

(a) a light source and associated light collecting means;

(b) means for forming a beam suitable for illuminating a distant subject, said beam having an elongated optical centerline, said means for forming a beam cooperating with said light collecting means and providing at least a first plane substantially oblique to said centerline at which light energy passing through substantially any point in said first plane is substantially equally distributed across a second plane that is substantially oblique to said centerline where said beam illuminates said distant subject;

(c) at least one filter array disposed substantially coplanar with said first plane, said filter array comprising at least thee filter segments mechanically coupled in a common array, each of said filter segments having a bandpass different than the others of said filter segments and generally spaced about an effective center;

(d) means for carrying said filter array and for displacing it relative to said centerline to any selected one of a substantially continuous range of possible positions between a first position at which substantially all of the light energy in said beam passes through said filter segments and a second position at which substantially none of the light energy in said beam passes through any of said filter segments;

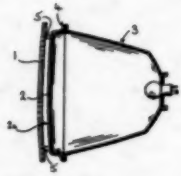
(e) means for rotating said filter array about said effective center to any selected one of a substantially continuous range of possible orientations such that the relative proportion of said energy passing through each filter segment in said filter array may be selected; and,

(f) means, operable from a remote location and cooperating with said means for displacing and with said means for rotating, for conforming said filter array to said selected position and said selected orientation, such that the apparent color of said beam may be varied.

4,894,761
PROTECTIVE SHIELD FOR A VEHICLE LAMP ASSEMBLY

Derick Gray, Warwickshire, England, assignor to Signam Limited, Warwick, United Kingdom

Filed Oct. 7, 1987, Ser. No. 105,238
Claims priority, application United Kingdom, Aug. 10, 1987, 8718876
Int. Cl.[4] F21V *15/00*
U.S. Cl. 362—376 14 Claims



1. A device for protecting the light-emitting face of a vehicle lamp assembly, said face having a peripheral edge, comprising:

a light transmitting shield in the form of a sheet of plastics material for covering at least a portion of said face and protecting said face from impact damage;

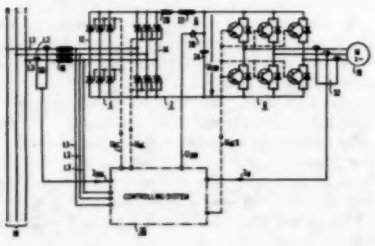
a plurality of mutually spaced distance pieces secured to said shield for spacing said shield from said face in use, each distance piece comprising a releasable two part connector; and

an adhesive for attachment of said distance pieces to said face, said distance pieces being arranged for attachment directly to said light-emitting face at positions inset from the peripheral edge thereof.

4,894,762
METHOD AND APPARATUS TO AVOID COMMUTATION FAILURE IN A REGENERATIVE CONVERTER

Axel Steinhorn, Wittighausen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed May 11, 1989, Ser. No. 350,310
Claims priority, application Fed. Rep. of Germany, Aug. 3, 1988, 3826402
Int. Cl.[4] H02M *5/44;* H02H *7/00*
U.S. Cl. 363—35 6 Claims



1. A method of preventing commutation failure in a regenerative converter of a supply reversible converter of a voltage-source converter during dynamic voltage depression or during a system voltage dip, with control of the firing of the regenerative converter and of a supply converter of the supply reversible converter being a function of the value of a link current setpoint of the voltage-source converter, the method comprising the steps:

generating the link current setpoint from a measured link voltage actual value and a controllable link voltage setpoint;

monitoring a measured link current setpoint to detect overcurrent;

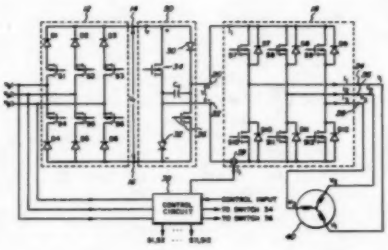
generating an overcurrent status message when overcurrent is detected; and

supplying control signals to the regenerative converter regardless of the presence of an overcurrent status message, when either a switch in current conduction is made from the supply converter to the regenerative converter, or during operation of the regenerative converter.

4,894,763
AC-AC CONVERTER USING SWITCHES IN A DC LINK

Khai D. T. Ngo, Gainesville, Fla., assignor to General Electric Company, Schenectady, N.Y.

Filed Dec. 5, 1988, Ser. No. 279,636
Int. Cl.[4] H02J *3/36*
U.S. Cl. 363—35 8 Claims



1. Apparatus for converting polyphase AC electric power at a first frequency and voltage to AC electric power at a second frequency and voltage, comprising:

a polyphase rectifier having input terminals for connection to a source of polyphase electric power and having a first and a second output terminal for providing rectified electric power;

a polyphase inverter having first and second input terminals for connection to a source of rectified electric power and having plural output terminals for connection to a load;

a first unidirectional current-carrying device connected between said first output terminal of said rectifier and said first input terminal of said inverter;

a second unidirectional current-carrying device connected between said second input terminal of said inverter and said second output terminal of said rectifier, said first and second unidirectional current-carrying devices being poled oppositely to each other;

first controllable switch means connected between said first output terminal of said rectifier and said second input terminal of said inverter;

second controllable switch means connected between said first input terminal of said inverter and said second output terminal of said rectifier; and

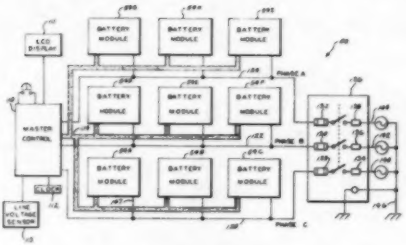
control means responsive to instantaneous polarity of current at one of said first and second input terminals of said inverter and to instantaneous polarity of the input line voltages for selectively gating said first and second controllable switch means substantially in synchronism into and out of conduction such that current at said rectifier output terminals is unidirectional regardless of current direction at said inverter input terminals and such that the rectified voltage at said inverter input terminals is maintained unipolar.

4,894,764

MODULAR AC OUTPUT BATTERY LOAD LEVELLING SYSTEM

John F. Meyer, Eagle, and David G. Porter, East Troy, both of Wis., assignors to Omnion Power Engineering Corporation, Mukwonago, Wis.

Filed Apr. 8, 1988, Ser. No. 179,158
Int. Cl.[4] H02M 7/68; H02J 9/00
U.S. Cl. 363—65 **23 Claims**



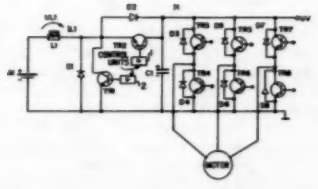
1. An electrical load levelling system, comprising:
a plurality of modules, each having an AC power input and an AC power output;
electrical energy storage means associated with each said module, said energy storage means having a DC power input and a DC power output;
power conversion means associated with each said module for converting output DC power from said energy storage means to AC power for output from said module, and input AC power to said module to DC power for input to said energy storage means;
power transfer means associated with each said module for inputting and outputting said AC power to and from said module; and
control means for controlling the supply of AC power to said system and the output of AC power from said system;
so that said system is adapted to receive electrical energy during periods of off-peak electrical demand, store said electrical energy until demand exists for said stored electrical energy and said demand is detected by said control means, and output electrical energy in response to said demand.

4,894,765

BI-DIRECTIONAL D.C./D.C. CONVERTER COMPATIBLE WITH AN INVERTER BRIDGE

Matti Kähkipuro, Hyvinkää, Finland, assignor to Kone Elevator GmbH, Finland

Continuation of Ser. No. 139,093, Dec. 22, 1987, abandoned. This application May 31, 1989, Ser. No. 361,661
Claims priority, application Finland, Dec. 22, 1986, 865280
Int. Cl.[4] H02M 7/00
U.S. Cl. 363—124 **28 Claims**



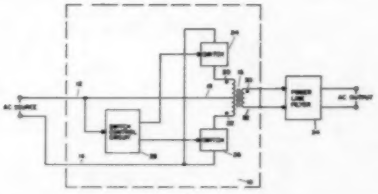
5. Apparatus for directly coupling an inverter and a converter by connecting an elevator inverter, having a power stage which includes a d.c. circuit, to a storage battery having a battery voltage lower than the voltage in said d.c. circuit, said apparatus comprising:
means for storing energy;
first voltage matching means for causing said battery voltage to equal the voltage in said d.c. circuit when power is flowing from said storage battery to said d.c. circuit;
said first voltage matching means comprising first semiconductor switch means for charging said energy storing means and first diode means for discharging energy from said energy storing means to said d.c. circuit; and
second voltage matching means for causing the voltage of said d.c. circuit to equal said battery voltage when power is flowing from said d.c. circuit to said storage battery means;
said second voltage matching means comprising second semiconductor switch means for charging said energy storing means and second diode means for discharging energy from said energy storing means to said storage battery means.

4,894,766

POWER SUPPLY FREQUENCY CONVERTER

William De Agro, Levittown, N.Y., assignor to Hazeltine Corporation, Greenlawn, N.Y.

Filed Nov. 25, 1988, Ser. No. 275,840
Int. Cl.[4] H02M 5/22
U.S. Cl. 363—159 **5 Claims**



1. Apparatus for converting a supplied alternating current (AC) input signal into an AC output signal having a selected lower frequency than the frequency of said AC input signal, comprising:
means for translating individual half cycles of said supplied AC input signal to an intermediate output signal with selected amplitude and polarity such that during successive pairs of first and second periods, each said period corresponding to a predetermined number of half cycles of said AC input signal, the translated half cycles of said AC input signal all have the same first selected polarity during said first periods and have the same second selected polarity during said second periods, said first and second polarities being opposites; and
means for filtering said intermediate output signal to develop said AC output signal having said selected lower frequency.

4,894,767

METHOD FOR YIELD TIGHTENING OF SCREWS

Tabito Doniwa, Hachioji, Japan, assignor to Dalichi Dentsu Kabushiki Kaisha, Chofu, Japan

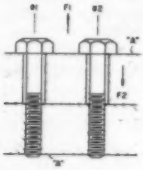
Filed Mar. 31, 1988, Ser. No. 175,749
Int. Cl.[4] G06F 15/00
U.S. Cl. 364—153 **8 Claims**

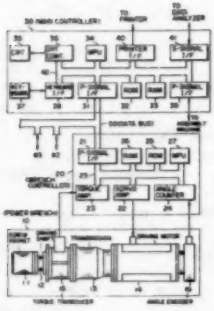
1. A method for yield tightening of screws by use of a wrench including a device for detecting a tightening torque, a device for converting a tightening angle and an electric motor for generating a screwing torque, and a controller including a device for receiving electric signals corresponding to the tightening torque and the tightening angle, a device for driving the electric motor, a read only memory for storing sequences

necessary for a tightening process, a calculating step and a judgement step, a random access memory for storing present data necessary for the tightening process and data obtained during the tightening process, a microprocessor for performing calculations and judgements necessary for the tightening process, a device for displaying the various data and a device for transmission and reception of a judgement signal and various data between the controller and external systems, the method comprising:

a step wherein after an actual tightening torque passes a certain preset torque limit, "n" (equal to or more than 4) pieces of actual torque data stored in a preset means are integrated by two integration stages and an average torque rate is calculated on the basis of a difference between the respective integrated values by the two stages;

a step wherein it is recognized that an actual torque curve has reached a yield area when it is determined that the average torque rate is smaller than a preset target torque rate;





a step wherein the tightening process is stopped immediately when the said recognition has been given in succession a plurality of times greater in number than ½ of the number "n";

a step wherein when the tightening process proceeds to a condition in which the next new data is provided, the oldest piece of data is removed from a routine of calculating the average torque rate and a new piece of data is added to the routine, the calculation being performed in succession updating the data to be calculated until the tightening process is stopped; and

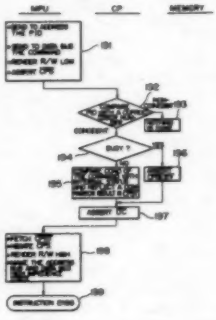
a step wherein after the actual tightening torque reaches the torque limit, an integrated value is calculated by subtracting the torque limit from the actual tightening torque, the area of a right triangle inscribed in the area of the integrated value is calculated, a difference value between the integrated value and the area of the right triangle is calculated, and when the difference value is larger than an area calculated by the use of a present target angle limit, the tightening process is immediately stopped.

4,894,768

DATA PROCESSING SYSTEM WITH COPROCESSOR

Kazuhiko Iwasaki, Hachioji; Tsuneo Funabashi, Tokyo; Ikuya Kawasaki, Kodaira; Hideo Inayoshi, Kokubunji; Atsushi Hasegawa, Koganei; Takao Yaginuma, Hitachiota, and Eiki Kondoh, Hitachi, all of Japan, assignors to Hitachi, Ltd.; Hitachi Microcomputer Engineering, Ltd., both of Tokyo and Hitachi Engineering Co., Ltd., Hitachi, all of, Japan

Filed Mar. 2, 1987, Ser. No. 21,007
Claims priority, application Japan, Mar. 17, 1986, 61-56844
Int. Cl.[4] G06F *13/00, 15/16*
U.S. Cl. 364—200 3 Claims



1. A data processing system comprising:

a first processor;

a second processor;

a memory;

an address bus interconnecting said first processor, said second processor and said memory;

a data bus interconnecting said first processor, said second processor and said memory;

a first signal line interconnecting said first processor and said second processor;

wherein said first processor fetches an instruction to be processed by said second processor;

wherein a command which corresponds to said instruction is sent to said second processor by said first processor over said data bus,

wherein instructions fetched by said first processor include a conditional branch instruction whose branch depends on whether a condition for branch is satisfied in said second processor,

wherein within one bus cycle said first processor sends a conditional branch command which corresponds to said conditional branch instruction to said second processor over said data bus,

and wherein within said one bus cycle said second processor sends a first signal to said first processor over said first signal line indicative of whether said condition for branch is satisfied.

4,894,769

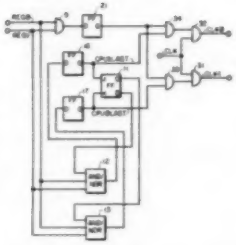
INCREASED BANDWITH FOR MULTI-PROCESSOR ACCESS OF A COMMON RESOURCE

Joseph A. Conforti, Phoenix, Ariz., assignor to AG Communication Systems Corporation, Phoenix, Ariz.

Filed Feb. 20, 1987, Ser. No. 17,385
The portion of the term of this patent subsequent to Sep. 27, 2005, has been disclaimed.
Int. Cl.[4] G06F *13/00, 13/14*
U.S. Cl. 364—200 18 Claims

1. In combination with an arbitration controller which provides for equal priority sharing of duplicate copy resources by active ones of first and second pluralities of duplicate pairs of

CPUs, said arbitration controller including first and second means for initialization each providing for a first signal; corresponding first and second pluralities of arbitration circuits, each plurality of arbitration circuits including a first, at least one successive and a last arbitration circuit; each of said means for initialization being connected to at least one of said corresponding plurality of arbitration circuits; first and second pluralities of CPU buses, each of said CPU buses of said first plurality of CPU buses connected to a respective one of said CPU buses of said second plurality of CPU buses and each of said CPU buses of said second plurality of CPU buses connected to a respective one of said CPU buses of said first plurality of CPU buses; first and second common buses, each common bus connected between an associated and corresponding one of said first and second pluralities of duplicate pairs of CPUs and a respective one of said duplicate copies of said resources via a corresponding one of said plurality of arbitration circuits; first and second pluralities of circuit connections, each of said plurality of circuit connections including a circuit connection between each said first arbitration circuit and each successive arbitration circuit, said last arbitration circuits being connected to said first arbitration circuit of its respective plurality of arbitration circuits forming ring connections and each arbitration circuit propagating said first signal through said ring connections; one arbitration circuit of each plurality of arbitration circuits operated in response to said first signal and to a common bus request signal from an active CPU to access each of said duplicate copy resources simultaneously; and each



arbitration circuit including: first arbitration gating means being operated to propagate said first signal along said ring connections at a high rate of speed; arbitration latching means connected to said first arbitration gating means and being operated to produce a second signal for allowing said active CPU to access said duplicate resources; and second arbitration gating means connected to said arbitration latching means and being operated to propagate a third signal from one said arbitration circuit to a next successive arbitration circuit for said ring connection; the improvement comprising:

clock means for generating a clock signal of a predetermined frequency;

means for detecting simultaneous access requests of a first and a second CPU of said first and second pluralities of duplicate pairs of CPUs respectively, said means for detecting being connected to a corresponding and respective arbitration circuit of said first and second plurality of arbitration circuits and being operated in response to said simultaneous access requests to produce a contention signal;

means for disabling connected to said means for detecting, to a corresponding and respective arbitration circuit of said first and second plurality of arbitration circuits and to said clock means, said means for disabling being operated in response to said contention signal and to an indication that said first CPU was previously granted access to said resources, to inhibit transmission of said clock signal to said arbitration circuit of said second plurality of arbitration circuits corresponding to said second CPU; and

means for enabling connected to said means for detecting, to a corresponding and respective arbitration circuit of said first and second plurality of arbitration circuits and to said clock means, said means for enabling being operated in response to said contention signal and to an indication that said first CPU was previously granted access to said resources, to transmit said clock signal to said arbitration circuit of said second plurality of arbitration circuits corresponding to said second CPU.

4,894,770

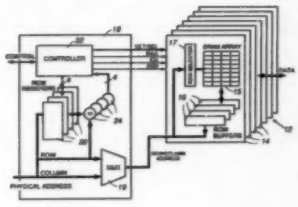
SET ASSOCIATIVE MEMORY

Stephen A. Ward, Chestnut Hill, and Robert C. Zak, Somerville, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Jun. 1, 1987, Ser. No. 57,272

Int. Cl.[4] G11C *7/00*

U.S. Cl. 364—200 **41 Claims**



1. A memory comprising:

a memory array logically arranged as rows and columns of storage elements addressable by row addresses, each element being capable of storing a single bit of data, each row of storage elements being directly accessible independent of other rows;

means responsive to row addresses received by memory for directly addressing rows of storage elements of the array for storage of rows in data buffers;

a plurality of data buffers, each data buffer being connected to the memory array to receive and store a row of data from any addressed row of the array and to provide data as an output of the memory;

means for selecting one of the data buffers to receive and store data from the memory array;

means responsive to a column address for addressing bits within a selected data buffer to access the data stored in an addressed location;

a plurality of address registers for storing row addresses of rows of the memory array of data stored in the data buffers;

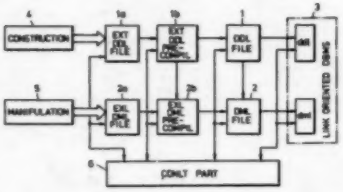
comparator means for comparing received addresses with addressses stored in the address registers to determine whether data to be addressed by a received row address is retained in a data buffer; and

control means for causing a read from the memory array to a selected buffer when the row indicated by the received row address is not stored in a data buffer and for selecting a data buffer for direct access when the data is already stored in the buffer.

4,894,771
DATA BASE MANAGEMENT SYSTEM EXTENDING STRUCTURE

Hideko Kunii, Tokyo; Issei Fujishiro, Tsukuba; Yasuto Shirai, and Toshyasu Kunii, both of Tokyo, all of Japan, assignors to Ricoh Company, Ltd., Japan

Filed Sep. 29, 1988, Ser. No. 251,097
Claims priority, application Japan, Dec. 19, 1987, 62-321796
Int. Cl.[4] G06F *1/00*
U.S. Cl. 364—200 **18 Claims**



1. A data base management system extending structure based on a link-oriented data model, said data base management system extending structure comprising:

a data base management system;

an extended data base language pre-compiler for pre-compiling an input file described in an extended data base language into an output file described in a data base language with which said data base management system can make an access; and

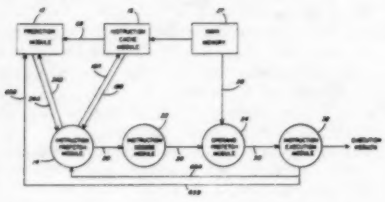
a control part for controlling operations of said data base management system and said extended data base language pre-compiler,

said extended data base language being added with a link attribute information to the data base language, said link attribute information specifying relationships of representation objectives.

4,894,772
METHOD AND APPARATUS FOR QUALIFYING BRANCH CACHE ENTRIES

Brian K. Langendorf, Worcester, Mass., assignor to Prime Computer, Inc., Natick, Mass.

Filed Jul. 31, 1987, Ser. No. 80,452
Int. Cl.[4] G06F *9/38, 13/00*
U.S. Cl. 364—200 **30 Claims**



1. A look ahead fetch system for a pipelined digital computer for predicting in advance of decoding the outcome of a branch instruction, comprising:

(A) branch cache means including "n" associative sets, where "n" is a positive number, each set storing a plurality of branch cache entries, each branch cache entry including data representing a branch outcome address corresponding to a branch instruction;

(B) instruction cache means for storing a plurality of instruction entries, said entries including branch instructions;

(C) coupling memory means, associated with said instruction cache, for storing a plurality of coupling codes, each coupling code being associated with an associated instruction entry.

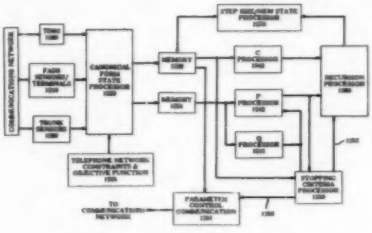
(D) means, coupled to said coupling memory means, for generating and writing to said coupling memory means said coupling codes, each indicating whether said branch cache contains a branch outcome address corresponding to the associated instruction cache entry, and

(E) means, coupled to receive said coupling codes from said coupling memory means and said branch outcome addresses from said branch cache means, for selecting the corresponding branch outcome address, if any, as the predicted address of the next instruction, in accordance with the corresponding coupling code.

4,894,773
METHOD AND APPARATUS FOR OPTIMIZING SYSTEM OPERATIONAL PARAMETERS THROUGH PROJECTIVE TRANSFORMATIONS

Jeffrey C. Lagarias, Summit, N.J., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Aug. 22, 1986, Ser. No. 899,109
The portion of the term of this patent subsequent to May 10, 2005, has been disclaimed.
Int. Cl.[4] G06F *15/20*
U.S. Cl. 364—402 **10 Claims**



1. Apparatus for adjusting, within respective constraint values, the values of a plurality of controllable operational parameters of a commercial system, to achieve an improved operational state of said system, said optimizing being accomplished when said controllable operational parameters are adjusted within a preselected set of constraints to minimize a set of preselected operational criterion values, comprising:

sensors coupled to said commercial system to be optimized for developing signal representations of said values of said operational parameters;

a first processor portion, responsive to said signal representations of said sensors, to values of said preselected set of constraints and to said preselected set of operational criterion values, for developing a canonical form signal representation of said operational state of said system, such that said minimizing is effected by

$$\begin{aligned} &\text{minimizing:} && c^T x \\ &\text{Subject to:} && A\underline{X} = 0 \\ & && e^T x = n \\ & && x \geqq 0 \end{aligned}$$

with side condition

$$Ae = 0,$$

where $\underline{x}$ is a vector related to said operational parameters, $\underline{T}$ is the transpose of a vector related to said set of preselected criterion values, n is the number of said operational

parameters, $\underline{A}=(a_{11}, a_{12}, \ldots, a_{ij}, \ldots, a_{mn})$ is an m by n matrix of coefficients related to said preselected set of constraints, and $\underline{e}$ is a vector of n components, each of which is equal to 1, e^T is the transpose of the vector e; said canonical signal representation forming a multidimensional space, with said operational parameters being the variables of said space, said matrix defining a polytope in said space, and said $\underline{c}$ vector specifying a direction in said space;

a second processor portion, responsive to said first processor portion, for projecting said operational parameters, said matrix, and said $\underline{c}$ vector unto a transformed space, and developing a matrix $\underline{Q}=(\underline{A}\underline{A}^T)^{-1}\underline{A}$, a matrix $\underline{P}=(\underline{I}-\underline{A}^T\underline{Q})$, and a vector $\underline{c}=\underline{P}\underline{D}\underline{c}$, where $\underline{D}=\text{diag}(x_i)$, $\underline{A}$ is a matrix that is the matrix $\underline{A}$ with an additional row of all 1's appended to it, $\underline{A}$ is the transpose of the matrix $\underline{A}$;

a third processor portion, responsive to said second processor portion, for computing a power series function in said transformed space of order greater than one that approximates a trajectory curve in consonance with said set of operational criterion values; and

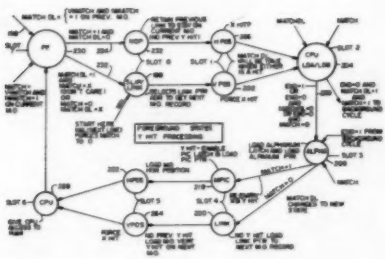
a controller, responsive to said third processor portion, for developing control signals, for physically setting said operational parameters of said system at values corresponding to a point along said trajectory curve.

4,894,774

LOOKAHEAD PIPELINE FOR PROCESSING OBJECT RECORDS IN A VIDEO SYSTEM

Patrick J. McCarthy, 1547 San La., San Jose, Calif. 95132, and George E. Logg, 1410 Cedar Pl., Los Altos, Calif. 94022

Filed Oct. 15, 1986, Ser. No. 919,234
Int. Cl.[4] G06F *15/44*
U.S. Cl. 364—410 **12 Claims**



1. An apparatus for searching a linked list of database records describing objects on a playfield to determine which meet display criteria and for displaying at least portions of objects meeting said display criteria, comprising:

means including a cathode ray tube for displaying a window portion of said playfield

and a plurality of selected objects located in said window on said cathode ray tube;

means coupled to said display means for storing graphic data defining the appearance of objects on said cathode ray tube;

means for storing a plurality of database records defining all the movable objects on said playfield, said database records organized in linked list format, each record defining the position and size of the associated object on said cathode ray tube by position and size data and containing a picture pointer portion including the address in said means for storing graphic data where the graphic data that defines the appearance of the associated object may be located, and each said database record including a link pointer portion pointing to the address of the next database record on said linked list;

first means for determining which objects represented by records on said linked list are to be displayed in said window by sequentially retrieving selected records for objects having records linked by said linked list and, for each record so retrieved, comparing the portions of said record defining the position and size of said object on said playfield to the boundaries of said displayed window portion of said playfield and for selecting those records which meet said display criteria in that said records have position and size information which indicates that the associated objects will be at least partially visible in said window portion;

second means coupled to said first means, for retrieving and storing said picture pointer portion of each said record selected by said first means as associated with an object which is to be at least partially displayed in said window portion, and for displaying, for each selected object record, at least some of the graphic data pointed to by said picture pointer portion of each selected record; and

third means coupled to said first and second means for speeding the process of locating records associated with objects which have positions and sizes such that the objects will be at least partially visible within said window portion by continuing the process of sequentially retrieving position and size data for subsequent records on said linked list after a record is selected by said first means by accessing the database record pointed to by the link pointer of the database record associated with the object selected by said first means and comparing said position and size data of said subsequent record to said window position to determine if any said subsequent record meets said display criteria and for continuing to search said linked list sequentially in this manner by accessing the link pointer portion of any data base record found to have a position on said playfield which will not be at least partially visible in said window portion and accessing the database record for the next record on said linked list as pointed to by said link pointer and retrieving and comparing said position and size data of said next record to the position of said window portion to determine if said display criteria is met until a database record is found for an object which meets said display criteria and for causing said second means to retrieve, store and display the graphic data for any object corresponding to a database record so found by said third means when said second means finishes retrieving and storing said graphic data for the record selected by said first means, and, if no record is found by said third means by the time said second means finishes retrieving and storing the graphic data for the object selected by said first means, for causing said first means to continue sequentially examining the records on said linked list for the next record on the linked list starting with the record on said linked list following the record last examined by said third means to locate the next record for an object which satisfies said display criteria.

4,894,775

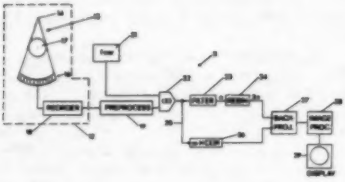
RECONSTRUCTION IN CT SCANNERS USING DIVERGENT BEAMS WITH FLATNESS CORRECTION FOR REORDERED DATA

Elishu Kritchman, Tel Aviv, and Jerome S. Arenson, Haifa, both of Israel, assignors to Elscint Ltd., Haifa, Israel

Filed Jul. 6, 1988, Ser. No. 215,762
Claims priority, application Israel, Jul. 17, 1987, 83233
Int. Cl.[4] G06F *15/42*; A61B *6/03*
U.S. Cl. 364—413.16 **28 Claims**

1. A method for detecting, modifying and rearranging divergent beam derived data to obtain tomographic images with maximum spacial resolution and with minimum artifacts, said method enabling fast processing, the method includes the steps of:

(a) directing a divergent beam of penetrating radiation through a body being examined from source means on one side of said body,
(b) angularly displacing the divergent beam relative to the body,
(c) detecting radiation that is passed through the body at a number of angularly spaced positions within the angles subtended by the divergent beam,
(d) deriving sets of detected radiation data representative of the variety of angularly and laterally spaced projections



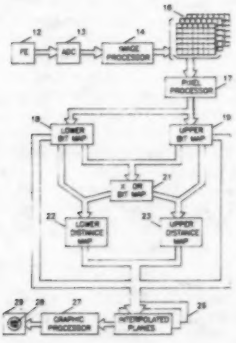
indicative of the transmission of the radiation through respective portions of the body,
(e) reordering the sets of detected radiation data to obtain laterally unequally spaced sampled data corresponding to parallel projections,
(f) correcting the reordered data for flatness,
(g) rebinning the sets of data corresponding to said reordered data to obtain laterally equally spaced parallel views, and
(h) back-projecting said laterally equally spaced parallel views to form tomographic images.

4,894,776

BINARY SPACE INTERPOLATION

Doron Dekel, Haifa, Israel, assignor to Elscint Ltd., Haifa, Israel

Filed Oct. 19, 1987, Ser. No. 109,400
Claims priority, application Israel, Oct. 20, 1986, 80364
Int. Cl.[4] G06F *15/42, 15/72, 15/353*
U.S. Cl. 364—413.13 **18 Claims**



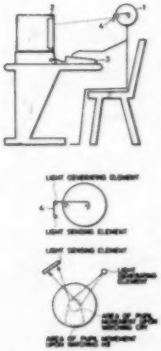
1. A process for constructing three dimensional images of an object in a body being imaged, said process comprising the steps of:
acquiring two dimensional maps of image data of two spaced apart planes in the interior of said body,
interpolating the acquired image data to provide image data for a plurality of planes between said spaced apart planes, said interpolating step comprising:
converting said maps of image data of said spaced apart planes to spaced apart binary bit maps where a presence of said image data of said object is indicated by one binary value and a lack of said image data of said object, is indicated by the other binary value, said one binary value indicating the interception of the object by a plane of said spaced apart planes, and the other binary value indicating the non-interception of the object by a plane of said spaced apart planes said image data comprising intersecting rows and columns of image values, each intersecting row and column representing a corresponding element of said planes and a corresponding pixel of said image,
determining corresponding elements of each of said spaced apart planes with different binary values,
determining the distance from one of said spaced apart planes to where there is a transition of binary values between said corresponding elements,
using said distance to provide interpolated binary data for said planes between said spaced apart planes,
converting said interpolated binary data to interpolated image data, and
using said acquired image data of said spaced apart planes and said interpolated image data of said planes between said spaced apart planes to provide three dimensional images.

4,894,777

OPERATOR MENTAL CONDITION DETECTOR

Hirokazu Negishi, Epsom Survey, United Kingdom, and Masao Hosaka, Sagamihara, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 28, 1987, Ser. No. 78,647
Claims priority, application Japan, Jul. 28, 1986, 61-175718
Int. Cl.[4] A61B *5/00*
U.S. Cl. 364—419 **65 Claims**

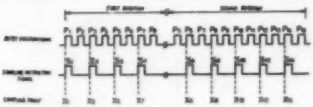


1. An information apparatus comprising:
processing means for performing various information processing operations in accordance with an instruction from an operator;
detection means for detecting a mental condition of the operator by detecting information indicating the personality of the operator during the information processing operations performed by said processing means in accordance with an instruction from the operator; and
output means for outputting information corresponding to the detected mental condition of the operator for relaxing the operator.

4,894,778
X-RAY COMPUTERIZED TOMOGRAPHIC DEVICE

Shigeru Matsumura, Tokyo, Japan, assignor to Yokogawa Medical Systems, Limited, Tokyo, Japan

Filed Sep. 16, 1988, Ser. No. 245,356
Int. Cl.[4] G06F *15/42*; G01T *1/17*
U.S. Cl. 364—413.15 2 Claims

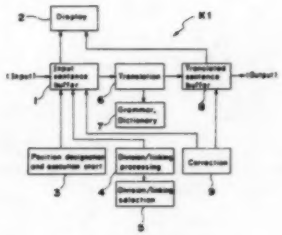


1. An X-ray computerized tomographic device comprising
a radiation source (1) rotatable in a rotary orbit around a subject to be examined while continuously radiating X-ray beams along sections of said subject;
a radiation detector (2) disposed opposite said radiation source with said subject being disposed therebetween, said radiation detector comprising a plurality of detection devices for detecting radiation in said subject, said radiation detector generating sample output signals when the position of said radiation source matches one of a plurality of sampling points arranged at equal intervals on said rotary orbit of said radiation source;
data collection means (6, 11, 15) for collecting data from said radiation detector at N·M−1 sampling points, wherein N is an integer, during M rotations of said rotation source in the same direction, wherein data is collected from a forward sampling point after skipping an M−1 sampling point adjacent to a point from which data was collected during a specific rotation, said data collecting means comprises a rotary encoder comprising N·M−1 marker means, and means for frequency dividing an output signal from said rotary encoder at a rate of 1/M and for outputting a sample time signal to said marker means; and
a computer (7) for reconfiguring collected data into tomographic images of said subject.

4,894,779
TRANSLATING APPARATUS

Hitoshi Suzuki; Shinobu Shiotani; Shinji Tokunaga, all of Nara; Tokuyuki Hirai, Yamatokoriyama; Yoji Fukumochi, Nara; Shuzo Kugimiya, Nara, and Ichiko Sata, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Nov. 25, 1987, Ser. No. 125,365
Claims priority, application Japan, Nov. 28, 1986, 61-284490; Nov. 28, 1986, 61-284492; Nov. 28, 1986, 61-284494
Int. Cl.[4] G06F *15/38*
U.S. Cl. 364—419 2 Claims

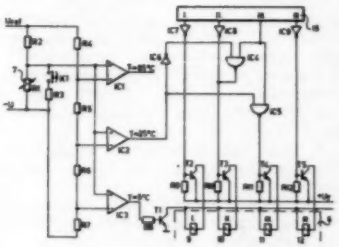


1. A translating apparatus for translating an input sentence and outputting its translated sentence, which apparatus displays the input sentence and the translated sentence comprising:
means for dividing the input sentence at a designated location into at least two character-strings, each said character-string being identifiable as a separate sentence;
means for linking a plurality of designated character-strings into the input sentence, each said character string being identifiable as a separate sentence;
means for selecting either one of said means for dividing or said means for linking when viewing one or more input sentences to the translated;
means for continuously inputting a plurality of sentences into the translating apparatus;
means for separating said continuously input plurality at sentences into separate sentences;
means for performing line feed of separate sentences; and
means for executing said means for separating prior to translation of the separately designated sentences.

4,894,780
PROCESS FOR SWITCHING THE GEAR-CHANGE OF AUTOMATIC TRANSMISSIONS OF MOTOR VEHICLES IN DEPENDENCE OF THE TEMPERATURE OF THE COOLING WATER

Sándor Simonyi, Salgótarján; György Ternóczky, Szigetszentmiklós; György Válóczi, and István Tóth, both of Salgótarján, all of Hungary, assignors to Csepel Autogyár, Salgotarján, Hungary

Filed Jan. 21, 1988, Ser. No. 146,516
Int. Cl.[4] B60K *41/18*, *31/00*
U.S. Cl. 364—424.1 5 Claims



2. In an apparatus for controlling a motor vehicle automatic transmission system for preventing premature transmission engagement and premature loading, and wherein the system is of the type having a manual selector control for the selection of at least I, II, III and R gears, individual control solenoids associated with each of said gears for effecting gear changes, a control system, including individual energizing circuits for said solenoids, for actuating said solenoids in a sequence in accordance with the position of said manual selector and the driving conditions experienced by said vehicle, and an engine temperature-responsive control associated with said control system for modifying the control of said solenoids as a function of engine temperature, the improvement which comprises,
(a) first circuit means responsive to sensing of engine temperature lower than a predetermined minimum to disable the energizing circuits for all of said solenoids and thereby prevent said vehicle transmission from being engaged in any of said gears,
(b) second circuit means responsive to the sensing of engine temperature higher than said predetermined minimum but lower than a predetermined normal level of engine temperature, to selectively disable the energizing circuit for one or more of the forward gears higher than the I gear,
(c) third circuit means responsive to the sensing of engine temperature at or above a predetermined normal temperature to enable the energizing circuits of all of said solenoids, and
(d) override circuit means for enabling the energizing cir-

cuits for all of said solenoids independently of engine temperature.

4,894,781

COMMUNICATION CONTROL SYSTEM

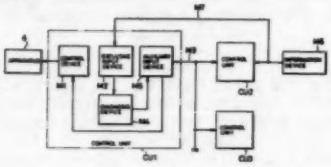
Yoshihisa Sato, Nagoya; Susumu Akiyama, Kariya; Yuji Hirabayashi, Aichi; Katsuhiro Ina, Okazaki; Katsunori Ito, Aichi; Takao Saito, Nagoya, and Tetsuo Tanigawa, Toyota, all of Japan, assignors to Nippondenso Co., Ltd., Aichi, Japan

Filed Oct. 1, 1987, Ser. No. 103,271

Claims priority, application Japan, Oct. 2, 1986, 61-234778

Int. Cl.[4] G06F *15/16*; G05B *15/02*

U.S. Cl. 364—431.11 **7 Claims**



1. A communication control system comprising:

a plurality of control means, each controlling a defined number of controlled devices;

common signal line means for transmitting information between said plurality of the control means;

where said plurality of the control means control the respective controlled devices based on said information transmission via said common signal line means;

first information generating means for generating first information necessary for control of a first controlled device which is controlled by a first control means among said plurality of the control means;

exclusive input means inputting the information from the first information generating means via an exclusive signal line;

wherein the information of the first information generating means is also applied to a second control means among said plurality of the control means;

wherein said first control means controls said first controlled device based on said information inputted by said exclusive input means;

wherein said first control means comprises means for judging whether said exclusive input means is operating normally, and controlling means for, when said exclusive input means is not operating in a normal manner, inputting the information of said first information generating means into said controlling means from said second control means via said common signal line means and controlling said first controlled device.

4,894,782

DIAGNOSTIC SYSTEM FOR DETERMINING ENGINE START BLEED STRAP FAILURE

Joseph F. Alcock, Palm Beach Gardens, and Roger D. Tull, West Palm Beach, both of Fla., assignors to United Technologies Corporation, Hartford, Conn.

Continuation of Ser. No. 135,022, Dec. 18, 1987, abandoned. This application Jun. 2, 1989, Ser. No. 361,732

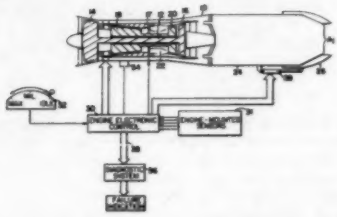
Int. Cl.[4] G06F *15/20*; F02C *9/18*

U.S. Cl. 364—431.02 **9 Claims**

1. In a gas turbine engine with operating conditions including a control mode and an engine operating power level having a band of intermediate power levels, the engine further having an engine start bleed strap, a diagnostic system for use with an engine electronic controller, said diagnostic system comprising:

a means for receiving signals indicative of a plurality of engine parameters including temperature of an engine turbine, engine inlet total temperature, pressure in an engine burner and engine inlet total pressure; and

a computing means receiving said parameter signals and signals indicative of the engine operating conditions, said computing means for comparing said engine operating signals with preselected values thereof and, in dependence on said comparison, for computing a relationship between said engine temperatures and a relationship between said



engine pressures, said computing means further for arithmetically determining a computed engine temperature - pressure relationship from said computed engine temperature relationship and said engine pressure relationship, comparing said computed engine temperature - pressure relationship with preselected values thereof and automatically providing signals indicative of a failed engine start bleed strap based on said comparison.

4,894,783

APPARATUS FOR DETECTING THE PASSAGE OF MULTIPLE SUPERPOSED SHEETS ALONG A FEED PATH

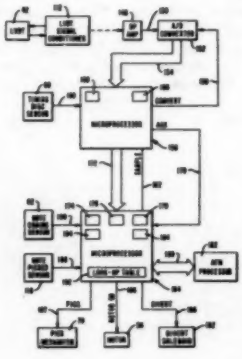
Douglas L. Milne, West Ferry, Scotland, assignor to NCR Corporation, Dayton, Ohio

Filed Sep. 16, 1988, Ser. No. 245,200

Claims priority, application United Kingdom, Jun. 2, 1988, 8813025

Int. Cl.[4] G06F *15/20*; B65H *7/12*

U.S. Cl. 364—479 **10 Claims**



1. In an apparatus for detecting the passage of superposed sheets along a feed path, including first and second cooperating rollers, said first roller having a fixed axis of rotation, and the diameter of one of said rollers being equal to, or a multiple of, the diameter of the other roller, means for feeding sheets along said feed path between said rollers, and means for mounting said second roller so that its axis is movable relative to that of

said first roller and so that it is biased towards said first roller to enable said second roller to be displaced away from said first roller in response to a single or multiple sheet passing between said first and second rollers, the improvement comprising:

voltage generating means associated with said second roller and arranged to produce an output voltage which varies linearly with movement of the axis of said second roller towards or away from the axis of said first roller;

analog-to-digital converter means to which said output voltage is applied;

pulse generating means for generating timing pulses in timed relationship with the revolution of said rollers; and

data processing means connected to the output of said converter means and to the output of said pulse generating means, said data processing means being arranged to perform the following steps: (a) sampling the value of said output voltage, as represented by the output of said converter means, a predetermined number of times for one complete revolution of said one of said rollers when no sheet is passing between said rollers, (b) storing a first digital value representative of the sum of the values of said output voltage sampled in step (a), (c) sampling the value of said output voltage, as represented by the output of said converter means, said predetermined number of times for one complete revolution of said one of said rollers when a single or multiple sheet is passing between said rollers, (d) storing a second digital value representative of the sum of the values of said output voltage sampled in step (c), and (e) subtracting said first digital value from said second digital value to produce a third digital value on the basis of which a determination is made of the number of sheets which passed between said rollers in step (c).

4,894,784

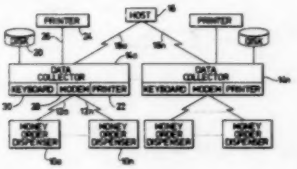
APPARATUS FOR DISPENSING MONEY ORDERS

Lawrence G. Smith, Orlando, Fla., assignor to Republic Money Orders, Inc., Dallas, Tex.

Continuation of Ser. No. 60,762, Jun. 8, 1987, which is a division of Ser. No. 877,539, Oct. 31, 1986, Pat. No. 4,699,532, which is a division of Ser. No. 596,291, Apr. 3, 1984, Pat. No. 4,625,275. This application Dec. 10, 1987, Ser. No. 132,661

Int. Cl.[4] G06F *15/30*

U.S. Cl. 364—479 **3 Claims**



1. A system for dispensing money orders at at least one retail establishment comprising:

a money order dispenser for dispensing money orders at a retail establishment;

a digital processor for controlling the operation of the dispenser;

a memory associated with the digital processor for storing the transaction data and control data;

a printer with a compartment for storing blank money order forms and coupled to the money order dispenser for receiving a blank money order form from said compartment and printing alphanumeric indicia thereon;

a host device remotely located from the retail establishment and coupled to the money order dispenser for management and control of the dispenser system;

a data collector remotely connected to the money order dispenser for issuing a polling command; and

means in the data collector for receiving transaction information from the money order dispenser upon issuance of said polling command.

4,894,785

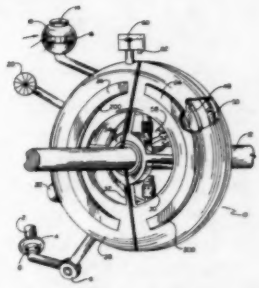
HIGH VOLTAGE CONDUCTOR MOUNTED LINE POWERED MONITORING SYSTEM

Roosevelt A. Fernandes, 104 Ruby Rd., Liverpool, N.Y. 13088

Filed Sep. 11, 1987, Ser. No. 95,158

Int. Cl.[4] G06F *15/54*; G01W *1/14*

U.S. Cl. 364—483 **11 Claims**



1. A sensor module for monitoring the presence and magnitude of precipitation occurring closely adjacent to a high voltage electrical conductor, said module comprising in combination:

(a) housing means mountable to and removable from said conductor while the latter is in an energized state;

(b) sensor means mounted upon said housing means and operable to generate an electrical signal having a value commensurate with the presence and magnitude of precipitation on a portion of said housing means;

(c) means mounted upon said housing means for encoding and processing said electrical signal for transmission as an RF signal;

(d) transmitting means including a hot stick directionally adjustable transmitting antenna mounted on said housing for transmitting said RF signal to a selected orbiting satellite; and

(e) power supply means mounted on said housing for operating said encoding and processing means and said transmitting means, said power supply means deriving power from said conductor.

4,894,786

SIGNAL PROCESSING METHOD FOR ANALYZING AUTORADIOGRAPH

Makoto Hara, Minami-ashigara, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Dec. 31, 1987, Ser. No. 140,222

Claims priority, application Japan, Jan. 6, 1987, 62-897

Int. Cl.[4] G06F *15/42*; C12Q *1/68*; C12N *15/00*

U.S. Cl. 364—497 **8 Claims**

1. A signal processing method for analyzing an autoradiograph to identify locations of radioactively labeled substances on a support medium, said labeled substances being resolved in a pattern along a one-dimensional developing direction on the support medium by subjecting to digital signal processing digital image data including a plurality of signals of different levels and values obtained by placing the support medium and a radiographic film together in layers to record the autoradiograph of the radioactively labeled substances on said radiographic film as a visible image, and photoelectrically reading out the autoradiograph visualized on the radiographic film, wherein said digital signal processing includes the steps of:

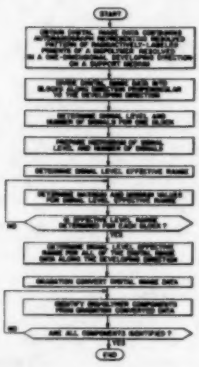
(a) dividing said digital image data into two or more blocks

along a direction perpendicular to the developing direction;

(b) determining the signal level and the number of signals for each of said blocks;

(c) preparing a histogram representative of the relationship between signal level and number of signals for each of said blocks.

(d) determining an effective range of signal level and the maximum value and the minimum value of said effective range of signal level from said histogram;



(e) determining an effective level range over all of the digital image data at every position along the developing direction on the basis of the effective level range determined for each block;

(f) using the effective level range determined in step (e), converting the digital image data to produce a gradation of digital signals dependent on the maximum and minimum signal values determined in step (d); and

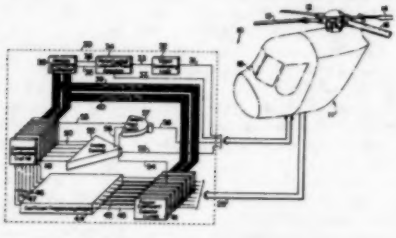
(g) identifying the positions of the radioactively labeled substances on the support medium from the gradation converted digital signals produced in step (f).

4,894,787

AUTOMATIC LOAD MONITORING SYSTEM WITH REMOTE SENSING

William G. Flannelly, South Windsor; Clifford T. Gunsallus, North Canton, both of Conn., and George F. Lang, Glen Rock, N.J., assignors to Kaman Aerospace Corporation, Bloomfield, Conn.

Filed Apr. 28, 1988, Ser. No. 187,227
Int. Cl.[4] G01M 7/00
U.S. Cl. 364—508 **32 Claims**



8. An apparatus for use in generating, from a first set of signals measured in a first member indicative of a first member parameter, a relational set of signals equating with said first signal set a second set of signals indicative of said parameter as measured in a cooperative second member, said apparatus comprising:

means directly configured with the first member for measuring a signal set indicative of a first member parameter;

means directly configured with the second member for measuring a second signal set including signals indicative of said parameter;

a controller including

means for Fourier decomposing said first member signal set into signals corresponding to a selected time independent first Fourier coefficient signal set

means for Fourier decomposing said second member signal set into signals corresponding to a selected time independent second Fourier coefficient signal set;

said first and second Fourier coefficient signal sets corresponding to respective first and second mathematical vectors lying in a vector space with each of said signal sets mathematically configured into respective first and second matrices comprised of elements corresponding to Fourier coefficient signals thereof arranged in rows and columns,

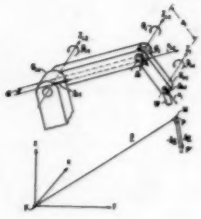
said controller for computing, from said second Fourier coefficient signal set, a substantially independent signal subset thereof having a plurality of elements that substantially spans said mathematical vector space, and for generating a relational signal set comprised of a mathematical pseudo inverse of said substantially independent signal subset and said first Fourier coefficient signal set.

4,894,788

METHOD FOR POSITIONING A TOOL OF A MULTI-JOINT ROBOT

Joerg Stelzer, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Apr. 21, 1988, Ser. No. 184,371
Claims priority, application Fed. Rep. of Germany, May 4, 1987, 3714806
Int. Cl.[4] G06F 15/46
U.S. Cl. 364—513 **1 Claim**



1. A method for positioning a tool of a multi-joint robot having a plurality of rotatable joints (G_{i-1}, G_i G_{i+1}) defining robot joint axes, with one of the joints being connected to the tool and the location and the orientation of the tool being represented in a reference coordinate system and the respective position of the tool relative to the reference coordinate system and the angular positions of the robot joint axes being linked by a coordinate-transformation equation system having parameters which are determined by the desired distances and desired directions of the robot joints representing the ideal kinematic of the robot, comprising the following steps:

(a) determining a preliminary desired angular position (θ_{i-1}, θ_i θ_{i+1}) for each of the joints, respectively, for a desired position in space (x) of the tool based upon reference

distances (a_{i-1}, a_i, a_{i+1} d_{i-1}, d_i, d_{i+1}) and directions of the joint axes required to position the tool in the desired position;

(b) determining the positioning error (Δx) of the tool due to the difference between the reference distance (a_{i-1}, a_i, a_{i+1}, d_{i-1}, d_i, d_{i+1}) and the desired directions and the actual spacings and actual direction of the joints (G_{i-1}, G_i, G_{i+1});

(c) transforming the determined positioning error (Δx) into corresponding angular correction values ($\Delta\theta$) for the preliminary desired angular positions (θ_{i-1},θ_i, θ_{i+1}) of the joints (G_{i-1}, G_i, G_{i+1}) by means of the inverse Jacobi matrix ($F\theta(\theta_i,F_{ref})^{-1}$) of the ideal kinematic of the robot of the coordinate-transformation equation system;

(d) calculating the error-corrected angular position (θ_i) for each of the joints (G_{i-1}, G_i, G_{+1}) by addition of the angular correction values ($\Delta\theta$) determined in step c) to the preliminary desired angular positions (θ_{i-1},θ_i, $\theta i+1$) determined in step a); and

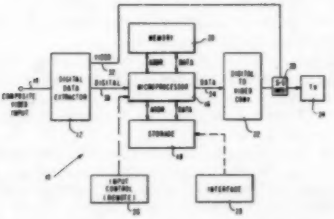
(e) moving the tool to the desired position by rotating the joints in accordance with the error-corrected angular position (θ_i) calculated in step (d).

4,894,789

TV DATA CAPTURE DEVICE

Keen Y. Yee, 57 Ogden Ave., White Plains, N.Y. 10605

Filed Feb. 22, 1988, Ser. No. 158,592
Int. Cl.[4] H04N *7/10*
U.S. Cl. 364—521 **14 Claims**



1. A digital data capture apparatus used by a receiving party and operating in combination with a receiving tv set or monitor, comprising:

a tv set or monitor,

means associated with said tv set or monitor for receiving a composite video-digital signal, said signal including digital data having no addresses associated therewith,

an extraction circuit enabling the receiving party to extract selected digital data from said composite signal,

storage means for storing said selected digital data under control of instructions directed to a microprocessor,

memory means communicating with said microprocessor for storing programs, said selected digital data, and addresses therefor,

a microprocessor for receiving said selected digital data from said extraction circuit, said microprocessor communicating with said memory means and with said storage means for controlling the selected storage, retrieval, and display of said selected digital data, and

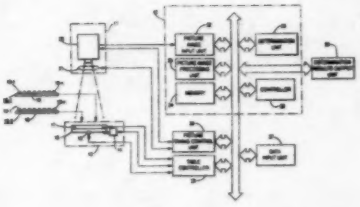
a digital-to-video converter for converting said selected digital data to video signals suitable for display on the screen of said tv set or monitor.

4,894,790

INPUT METHOD FOR REFERENCE PRINTED CIRCUIT BOARD ASSEMBLY DATA TO AN IMAGE PROCESSING PRINTED CIRCUIT BOARD ASSEMBLY AUTOMATIC INSPECTION APPARATUS

Teruhisa Yotsuya, and Hideaki Takahara, both of Kyoto, Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Feb. 5, 1987, Ser. No. 11,481
Claims priority, application Japan, Feb. 5, 1986, 61-23294; Feb. 14, 1986, 61-31719
Int. Cl.[4] G06F *7/02, 15/20;* G01N *21/88, 21/91*
U.S. Cl. 364—552 **15 Claims**



1. A method for automatic inspection of printed circuit board assemblies having component parts mounted on a base printed circuit board by processing an image which is obtained from said base printed circuit board mounted with said component parts and by inputting reference printed circuit board assembly data to an inspection step in said method, said method comprising the steps of:

preparing a reference base printed circuit board with reference component parts mounted thereon in which the visual distinction between said reference base printed circuit board and said reference component parts is clear;

obtaining an image from said reference base printed circuit board mounted with said reference component parts;

processing said image to obtain said reference printed circuit board assembly data, which contains information of predetermined characteristics of said reference component parts;

storing said reference printed circuit board assembly data; and

inspecting said printed circuit board assemblies by obtaining an image therefrom, processing said image to obtain printed circuit board assembly data containing information of characteristics of the component parts mounted on said printed circuit board assemblies, inputting said reference printed circuit board assembly data and comparing the component part characteristics in the printed circuit board assembly data so obtained with the reference component part characteristics in the stored reference printed circuit board assembly data to determine acceptability of the printed circuit board assemblies,

wherein said reference base printed circuit board is arranged to have low visual brightness, while said reference component parts are arranged to have high visual brightness.

4,894,791

DELAY CIRCUIT FOR A MONOLITHIC INTEGRATED CIRCUIT AND METHOD FOR ADJUSTING DELAY OF SAME

Ching-Lin Jiang, Dallas, and William J. Podkowa, Plano, both of Tex., assignors to Dallas Semiconductor Corporation, Dallas, Tex.

Filed Feb. 10, 1986, Ser. No. 828,230
Int. Cl.[4] H03K *5/13*
U.S. Cl. 364—570 **17 Claims**

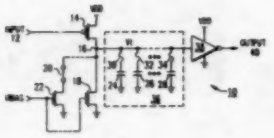
1. A delay circuit fabricated in a monolithic integrated circuit, said delay circuit being adapted for receiving an input

signal and having a ground, an internal signal node, and an output node, comprising:

a. a plurality of capacitors;

b. a plurality of laser-fusible links equal in number to said capacitors, each of said laser-fusible links being electrically connected in series with a corresponding one of said capacitors between said ground node and said internal signal node;

c. an enhancement-made field effect transistor, connected to precharge said internal signal node to a first predetermined voltage when said input signal is at a first binary state;



d. an enhancement-mode field-effect transistor, connected the discharge said internal signal node to a second predetermined voltage when said input signal transitions to the binary logic opposite that of said first binary logic state; and

e. voltage detector means responsive to the voltage level of said internal signal node and coupled to said output node for generating an output signal on said output node to indicate when the voltage of said internal signal node has discharged to said second predetermined voltage;

whereby an output signal is provided having a delay that is reducibly adjustable with respect to said input signal.

4,894,792

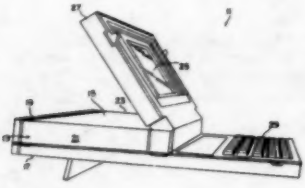
PORTABLE COMPUTER WITH REMOVABLE AND REPLACEABLE ADD-ON MODULES

Dennis R. Mitchell, San Jose; James R. Molenda, Fremont, and Karl S. Nakamura, Palo Alto, all of Calif., assignors to Tandy Corporation, Fort Worth, Tex.

Filed Sep. 30, 1988, Ser. No. 252,177

Int. Cl.[4] G06F *1/00*

U.S. Cl. 364—708 **11 Claims**



1. A portable computer and plug-in modules constructed to permit add-on cards and add-on components in the modules to access the computer bus by direct plug-in of the modules to the computer without cabling and without altering the portability of the computer,

said portable computer comprising,

an outer case having a top, bottom, back and sides,

a main logic board mounted within the outer case,

bottom plug-in connector means connected to the main logic board and including a bottom plug-in connector extending through the bottom of the outer case for engagement with a related connector of a bottom add-on module,

said bottom add-on module comprising,

a frame support,

a power supply board mounted within the frame support,

an add-on card mounted within the frame support and operatively associated with the power supply board, and

an add-on module connector positioned to be directly connectable and disconnectable from said bottom connector without cabling,

said computer including a battery tray compartment within the back of the outer case for permitting a battery to be inserted into and remove from the computer,

a battery tray compartment plug-in board at the inner end of the battery tray compartment and having a plug-in connector operatively connected to the main logic board for providing general purpose access to the computer bus through said plug-in connector,

a removable, battery tray compartment, plug-in module comprising,

an outer housing having an outer configuration shaped to slide smoothly into and out of the battery tray compartment and having internal supports for a component board,

at least one compartment board supported within the outer housing and having a back connector and a front connector at opposite ends of the component board,

a back plate attached to the housing and having an opening for the back connectors of the plug-in board so that the back connector of the component board is directly connectable to and detachable from the connector on the plug-in board without cabling when the outer housing is inserted into and removed from the battery tray compartment,

a mass storage area opening within one side of the outer case for permitting general purpose access and particularly selected mass storage apparatus access to the computer bus,

a drawer board located at the inner end of the mass storage area and having a connector operatively connected to the main logic board for providing general purpose access to the computer bus through the connector,

a drawer carrier attached within the outer case of the computer in the mass storage area,

a plug-in drawer tray insertable in the drawer carrier,

a component board mounted within the tray and having a back connector and a front connector with the back connector located to be directly connectable to said connector on the drawer board, and

fasteners for locking the tray into the outer case of the portable computer after the tray has been inserted and the back connector of the component board has been connected to the connector on the drawer board,

whereby function cards, mass storage devices, communication devices, interface display devices, interface to instrumentation interfaces, interfaces to small servers (and any other part connectable to the computer bus) is incorporated in the portable computer by direct plug in of a module and without requiring redesign or change to the existing, internal component structure of the computer itself.

4,894,793

CALORIE CALCULATOR WITH MENU RETRIEVAL FUNCTION

Yutaka Ikemoto, and Akiyoshi Yamashita, both of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Apr. 30, 1985, Ser. No. 728,888

Claims priority, application Japan, May 10, 1984, 59-94367

Int. Cl.[4] G06F *15/42, 3/00, 13/00*

U.S. Cl. 364—709.03 **6 Claims**

1. A calorie calculator comprising:

keyboard means for manually controlling the operation of the calorie calculator;

said keyboard means comprises first menu item retrieval key means for selecting the heading letters of menu items, second menu item retrieval key means for selecting the

names of menu items, and third menu item retrieval key means for presenting menu item data in reverse order;

memory means for storing a plurality of items of menu data and the corresponding calorie data;

retrieval means responsive to the operation of said keyboard means for retrieving a particular item of the menu data and the corresponding calorie data from said memory means; and

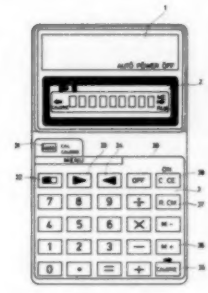
output means responsive to said retrieval means for outputting the particular item of the menu data and the corresponding calorie data.

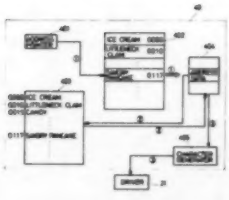
6. A calorie counter comprising

keyboard means having a plurality of keys for carrying out different functions,

a mode selection key for selecting a first and a second mode of the calculator,

a first data memory operated only in the first mode,





a display means for displaying information,

a second data memory for storing the menu and the corresponding calorie data,

said second data memory is operated only in said second mode,

predetermined memory contents in the second data memory provided in succession to be selected in one or the opposite direction by actuating keys repeatedly for displaying said memory contents as information on said display means,

a further key is provided for summing up parts of the memory contents of different memory areas of said second data memory when actuating said further key, and

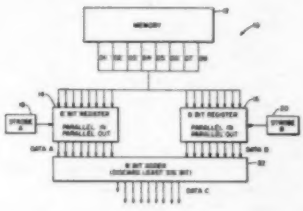
a character generator is provided for generating a display pattern on said display means corresponding to the particular memory contents.

4,894,794

SYSTEM FOR PROVIDING CONTINOUS LINEAR INTERPOLATION

Edwin K. Shenk, Westford, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Oct. 15, 1985, Ser. No. 787,639
Int. Cl.[4] G06F 7/38
U.S. Cl. 364—723 **8 Claims**



1. A system for continuously linearly interpolating intermediary binary numbers from a continuous stream of binary numbers, said system comprising:

a first register for receiving and storing one binary number at a time from the continuous stream of binary numbers;

a second register for receiving and storing one binary number at a time from the continuous stream of binary numbers;

averaging means connected to receive output binary numbers from said first and second registers for providing an output binary number equal to the average value of the binary numbers received from said first and second registers;

first means for strobing said first register so that said first register sequentially receives for storage therein binary numbers one at a time from said continuous stream of binary numbers and simultaneously outputs the stored binary number therefrom to said averaging means; and

second means for strobing said second register so that said second register sequentially receives for storage therein binary numbers one at a time from said continuous stream of binary numbers and simultaneously outputs the stored binary number therefrom to said averaging means, said first and second strobing means being coordinated with respect to each other so that each of said binary numbers from the continuous stream of binary numbers is simultaneously stored by both of said first and second registers during each respective one of a plurality of first succeeding time intervals and each pair of adjacent binary numbers from the continuous stream of binary numbers is stored, respectively, by said first and second registers during each respective one of a plurality of second time intervals alternating with said first time intervals, said averaging means operating to provide output binary numbers equal to the average value of said stored binary numbers during said first and second intervals, respectively, wherein the average values provided during said second intervals correspond to interpolated binary numbers.

4,894,795

HIGH-RESOLUTION TECHNIQUE FOR TIME-FREQUENCY SIGNAL ANALYSIS USING MODIFIED WIGNER-VILLE ANALYSIS

Harper J. Whitehouse, San Diego, Calif., and Boualem Boashash, Quunsland, Austria, assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 28, 1987, Ser. No. 43,651
Int. Cl.[4] G06G 7/19
U.S. Cl. 364—807 **39 Claims**

1. A method of improving the resolution of a linear FM

signal $s(t)=a(t)\cos\Phi(t)$ where $\Phi(t)=2\pi(a_0t+\alpha t^2)$ and in which α is a chirp parameter comprising the steps of:

translating in translating means received linear FM signals $r(t)=\Sigma^N_{i=1}\,a_is(t-\tau_i)$ to an analytic signal of the form $z(t)=\Sigma^N_{i=1}\,a_i\Phi(t-\tau_i)$;

formulating in formulating means the analytic signal form z(t) into a Wigner-Ville kernel sequence $z(t+\tau/2)z^*(t-\tau/2)$;

analyzing in analyzing means the frequency of the kernel sequence $z(t+\tau/2)z^*(t-\tau/2)$ by a high resolution estimation technique to provide a signal having an improved time/frequency representation; and

applying the improved time/frequency representation signal in an appropriate processing means to present a degree of resolution of an order of magnitude greater than a discrete Fourier transform implemented by a fast Fourier transform.

4,894,796

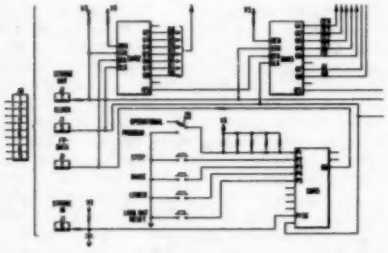
AUTOMATIC TRANSFER SWITCH WITH PROGRAMMABLE DISPLAY

Joseph C. Engel, Monroeville Boro, and James L. Lagree, Plum Borough, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 17, 1986, Ser. No. 840,241

Int. Cl.[4] G06F *3/14*; G09G *3/00*

U.S. Cl. 364—900 **13 Claims**



1. Display apparatus, comprising:

M display means each with X parallel input ports for converting X bits of parallel input data to a display symbol;

first shift register means with X parallel output ports, a serial input port and a separate serial output port for receiving at said serial input port said X bits in series and for providing said X bits of serially entered data simultaneously, one each at each of said X parallel output ports;

second shift register means with N parallel output ports and a serial input port which is connected to said serial output port of said first shift register means for receiving N bits of serial data therefrom and for providing N bits of serially entered data simultaneously, one each at each of said N parallel output ports;

X bit parallel data bus means communicating with said X parallel output ports, and with said X parallel input ports of each of said display means for delivery of said X bits of parallel input data to all of said M display means simultaneously;

each of said M display means having a separate enabling means which is interconnected with a combination of said N parallel output ports for being enabled thereby to display said symbol as a function of the occurrence of a coded combination of enabling bits on said N parallel output ports; and

formatting means serially interconnected with said serial input port of said first shift register means or supplying a serial digital word of data comprising said N bits and said X bits in series to said first shift register means, wherein said N bits are serially passed therethrough to said second shift register means wherein said N bits contain only one coded combination of said enabling bits per said word for said N out ports so that only a predetermined one of said M display means is enabled per said digital word to display said symbol associated with said X bits.

4,894,797

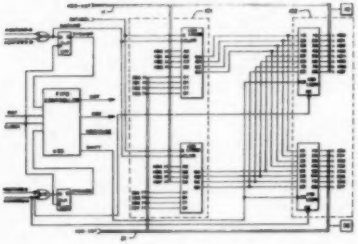
FIFO DATA STORAGE SYSTEM USING PLA CONTROLLED MULTIPLEXER FOR CONCURRENT READING AND WRITING OF REGISTERS BY DIFFERENT CONTROLLERS

Patrick K. Walp, Penngrove, Calif., assignor to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 931,505, Nov. 17, 1986, abandoned. This application Jun. 16, 1988, Ser. No. 210,147

Int. Cl.[4] G06F *13/00, 13/10, 13/12*

U.S. Cl. 364—900 **2 Claims**



1. A data storage device for storage and retrieval of data by first and second control units, the data storage device comprising:

a first register comprising first data storage means, and means for multiplexing data between one of the first and second control units and the first data storage means;

a second register comprising second data storage means, the second data storage means comprising means for receiving data from the first data storage means, the second register comprising means for allowing data to be retrieved from the second data storage means by the first and second control units; and

a controller electrically connected to at least one of the first or second register and receiving a clock signal CLOCK, a read request SYDARD synchronized with the clock signal, a write request SYDAWR synchronized with the clock signal and a reset signal RESET; wherein the controller is operative to control the data transfer from the first register to the second register by means of a signal SHIFT and to output a register full status signal DRF and a register empty status signal; and wherein the signals CLOCK, SYDARD, SYDAWR, RESET, SHIFT, DRF, and DRE are generated in accordance with the following relations:

NOEXTUSE = (DRE* & DRF & SHIFT* & SYDAWR
# NOEXTUSE & DRF & SHIFT
# NOEXTUSE & DRE & DRF* & SHIFT* & SYDAWR*
# DRE* & DRF & SHIFT & SYDARD* & SYDAWR*

-continued

# NOEXTUSE* & DRE & DRF* & SHIFT & SYDARD* & SYDAWR*
# NOEXTUSE & DRE* & DRF & SYDARD*);
SHIFT = (DRE* & DRF & SHIFT* & SYDAWR
# NOEXTUSE & DRE* & DRF & SYDAWR
# NOEXTUSE* & DRE & DRF & SYDAWR*
# NOEXTUSE* & DRF & SYDARD* & SYDAWR
# NOEXTUSE* & DRE & SHIFT & SYDARD & SYDAWR*);
DRE = (NOEXTUSE & DRE & DRF & SHIFT
# DRE & DRF* & SHIFT*
# NOEXTUSE* & DRF* & SHIFT* & SYDARD*
# NOEXTUSE* & DRE & DRF* & SYDARD*
# NOEXTUSE* & SHIFT* & SYDARD* & SYDAWR*
# NOEXTUSE* & DRE & SYDAWR*); and
DRF = (DRE* & DRF & SHIFT*
# NOEXTUSE & DRE* & DRF
# NOEXTUSE* & DRF* & SHIFT* & SYDAWR*
# NOEXTUSE* & DRF & SYDARD*
# DRE* & DRF & SYDAWR*)
where # represents the boolean OR operation and & represents the boolean AND operation;

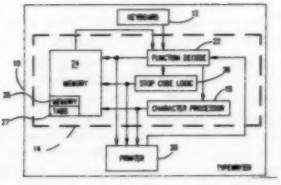
the controller operative to control a nonvirtual transfer of data from the first register to the second register such that data may be stored in the first register by one of the first and second control units while independently data is being retrieved from the second register by an other of the first and second control units and the data retrieved is a longest stored data in the data storage device.

4,894,798

AUTOMATIC STOP CODE INSERTION FEATURE FOR A WORD PROCESSING APPARATUS

Marguerite H. Doyle; Roger W. Early; Steven R. Myers; Terrence W. Ringle, and David R. Smith, all of Lexington, Ky., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 20, 1986, Ser. No. 876,615
Int. Cl.[4] G06F *3/12*; B41J *21/16*
U.S. Cl. 364—900 **8 Claims**



1. A word processing apparatus comprising:

a keyboard for inputting first commands to said word processing apparatus to effect the printing of text and to control the storage of said text said keyboard further comprising means for inputting of second commands for controlling functions affecting printing operations of said apparatus;

a print means for forming an image on a record sheet upon command from said keyboard;

control means comprising means for storing codes representative of said text and parameters defining the formatting of said text;

said control means responsive to said keyboard and connected to said spring means for controlling said print means to print images corresponding to said first commands through the keyboard and to print text stored in said control means;

said control means comprising means for detecting changes in said functions and means for determining whether any said change in said functions requires operator intervention;

insertion means, responsive to said means for determining, for inserting into said stored text a stop code without operator action,

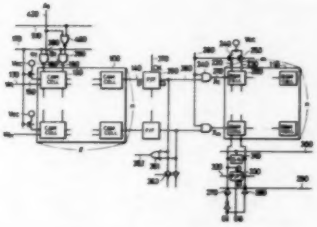
whereby when said text is played out said apparatus will respond to said stop code and interrupt playout operations pending said operator intervention.

4,894,799

CONTENT-ADDRESSABLE MEMORY

Makoto Hanawa, Kokubunji, and Takuichiro Nakazawa, Kodaira, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 12, 1988, Ser. No. 193,942
Claims priority, application Japan, May 13, 1987, 62-114599
Int. Cl.[4] G11C *15/00*
U.S. Cl. 365—49 **7 Claims**



1. A content-addressable memory comprising;

a storage bit cell for holding a first data and a second data, these first and second datas being in opposite phases;

signal supplying means for supplying a first signal and a second signal, respectively, to a first data line and a second data line of the storage bit cell in response to an input signal, the first and second signals being in opposite phases;

comparison means for detecting a first relation between the first data stored in the storage bit cell and the first signal on the first data line supplied from the signal supplying means and a second relation between the second data stored in the storage bit cell and the second signal on the second data line supplied from the signal supplying means,

controlling means for controlling a potential of a word coincidence line based on the result of detecting by the comparison; and,

means for reading out information of the word coincidence line, wherein the signal supplying means has a means for dissolving the opposite phase relation between the first signal on the first data line and the second signal on the second data line in response to a control signal and the input signal.

4,894,800

RECONFIGURABLE REGISTER BIT-SLICE FOR SELF-TEST

Charles L. Hudson, Jr., Plymouth, Minn., assignor to Honeywell, Inc., Minneapolis, Minn.

Filed Sep. 23, 1988, Ser. No. 248,888
Int. Cl.[4] G11C *13/00*
U.S. Cl. 371—22.5 **16 Claims**

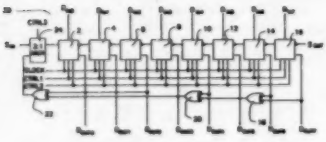
1. A register bit-slice, comprising:

(a) memory means for storing a bit, the memory means comprising an input for receiving a data signal; and

(b) front-end logic means, comprising:

(i) an output logically coupled to the input of the memory means;

(ii) control input means for receiving one or more control input signals;
(iii) first data input means for receiving a first data input signal;
(iv) second data input means for receiving a second data input signal;
(v) a current switch;
(vi) means for operating in a first operational mode by logically coupling the first data input means to the input of the memory means while switching at most one current switch along a signal path from the first data input means to the input of the memory means;



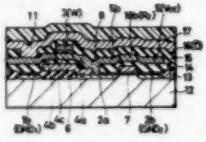
(vii) means for operating in a second operational mode by logically coupling the second data input means to the input of the memory means;
(viii) means for operating in a third operational mode by providing to the input of the memory means a logical function generated from the input signals received from the first and second data input means; and
(ix) means for selectively configuring to one of the operational modes based on the one or more control input signals.

4,894,801

STACKED MOS TRANSISTOR FLIP-FLOP MEMORY CELL

Ryuichi Saito, Tokyo, and Naohiro Momma, Hitachi, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 24, 1987, Ser. No. 77,176
Claims priority, application Japan, Aug. 1, 1986, 61-179969
Int. Cl.[4] G11C 7/00, 11/40
U.S. Cl. 365—154 **26 Claims**



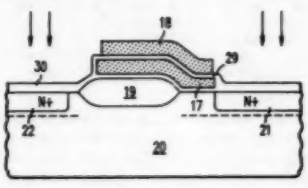
1. A semiconductor memory including a pair of driver MOS elements constituting a flip-flop, a pair of resistor elements and a pair of transfer MOS elements for address selection, comprising:
gate electrodes for said pair of driver MOS elements which are formed by respective first and second parts of a first-level polycrystalline silicon layer;
source and drain regions for said pair of transfer MOS elements for address selection which are disposed within a second-level polycrystalline silicon layer; and
gate electrodes for said pair of transfer MOS elements which are disposed in respective parts of a third-level polycrystalline silicon layer.

4,894,802

NONVOLATILE MEMORY CELL FOR EEPROM INCLUDING A FLOATING GATE TO DRAIN TUNNEL AREA POSITIONED AWAY FROM THE CHANNEL REGION TO PREVENT TRAPPING OF ELECTRONS IN THE GATE OXIDE DURING CELL ERASE

Steve K. Hsia, Saratoga, and Chan-Sui Pang, Sunnyvale, both of Calif., assignors to Catalyst Semiconductor, Inc., Santa Clara, Calif.

Filed Feb. 2, 1988, Ser. No. 151,379
Int. Cl.[4] G11C 11/40; H01L 29/79
U.S. Cl. 365—185 **3 Claims**



1. A nonvolatile memory cell comprising:
a body of semiconductor material of first conductivity type;
source and drain regions of second conductivity type extending into said body from a surface;
a channel region extending to said surface between said source and drain regions;
a first layer of insulating material of a first thickness on said surface above said source, drain and channel regions;
a tunnel window insulation area included on said surface and within said first insulating material, said tunnel window insulation area having a thickness less than said first thickness and said tunnel window insulation area having a portion extending above a portion of said drain region and a portion extending above said surface of the body adjacent to said drain region;
a floating gate on said first layer of insulating material and over at least a portion of said tunnel window insulation area, said floating gate having one edge overlying a portion of said drain region with said overlying edge portion extending over said tunnel window insulation area thereby defining a floating gate to drain region tunnel area in which the floating gate is closer to said drain region than is the remaining portion of said floating gate edge overlying said drain region, said floating gate to drain tunnel area being positioned such that the distance from said source region to floating gate to drain tunnel area is greater than the shortest distance, measured across said channel region, between said source region and said drain region;
a second layer of insulating material covering said floating gate; and
a control gate on said second layer of insulating material overlying said floating gate.

4,894,803

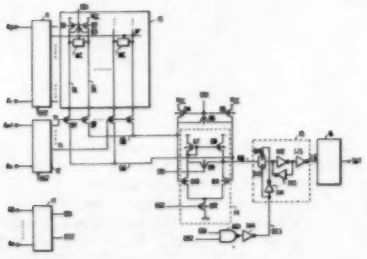
MEMORY CIRCUIT WITH IMPROVED DATA OUTPUT CONTROL

Shingo Aizaki, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Feb. 29, 1988, Ser. No. 161,806
Claims priority, application Japan, Feb. 27, 1987, 62-45730
Int. Cl.[4] G11C 7/00, 11/40
U.S. Cl. 365—189.05 **7 Claims**

1. A memory circuit comprising a memory cell array having

a plurality of memory cells arranged in a matrix form of rows and columns, row lines arranged in rows and column lines arranged in columns, precharge means coupled to said column lines for operatively precharging said column lines thereby setting said column lines at a predetermined potential, means for receiving address input signals, a sense amplifier having an input end and an output end, a selection circuit connected between said column lines and the input end of said sense amplifier for selectively transferring a signal at one end of said column lines to the input end of said sense amplifier in accordance with said address input signals, a latch circuit having an input end and an output end for holding a signal at the input end thereof, a transfer circuit connected between the output end of said sense amplifier and the input end of said latch circuit for operatively providing a signal path therebetween, an output circuit having an input end coupled to the output end of said latch circuit for generating an output signal, a control



signal generator coupled to said receiving means for generating first and second control signals when the level of at least one of said address input signals is changed, said second control signal being generated after the generation of said first control signal and terminated after the termination of said first control signal, first control means for enabling said precharge means in response to said first control signal, a second control means for enabling said sense amplifier in response to said second control signal, and a third control means for enabling said transfer circuit only when said second control signal is present and said first control signal is not present, whereby said memory cell array is first laid in a reset state in response to said first control signal in which said column lines are precharged and then laid in an enabled state in which read out signals from the memory cells are generated on said column lines after the termination of said first control signal under the presence of said second control signal.

4,894,804

RESETTING ARRANGEMENT FOR A SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE HAVING SEMICONDUCTOR MEMORY

Makio Uchida, Tokyo, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

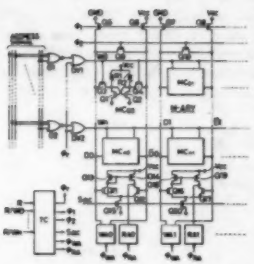
Continuation of Ser. No. 860,411, May 7, 1986, Pat. No. 4,758,990. This application Jun. 28, 1988, Ser. No. 212,575
Claims priority, application Japan, May 7, 1985, 60-95487
Int. Cl.[4] G11C *7/00*
U.S. Cl. 365—190 **31 Claims**

1. A static memory comprising:

a plurality of static type memory cells which store data therein;

a plurality of word lines and a plurality of pairs of complementary data lines coupled to said plurality of memory cells so that each static type memory cell is coupled to a word line and a pair of complementary data lines; and

selecting means coupled to said plurality of word lines including decoder means responsive to address signals for selecting one of said plurality of word lines and further including simultaneous selection means responsive to a



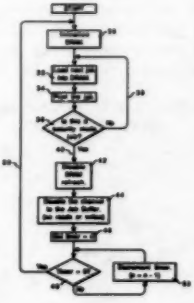
control signal for simultaneously bringing predetermined word lines into a selection state.

4,894,805

SECURITY PRINTER/COPIER

Russell L. Godshalk, Hilton, and Gary W. Shope, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 28, 1988, Ser. No. 187,135
Int. Cl.[4] G11C *7/00*
U.S. Cl. 365—222 **4 Claims**



1. In a copier/printer having a memory for storing job image data, the memory being of the type requiring periodic refresh to prevent degradation of stored data; the improvement comprising security means for disabling memory refresh for a time period sufficient to allow the data to degrade sufficiently to be unrecoverable in recognizable form.

4,894,806

ULTRASONIC IMAGING SYSTEM USING BUNDLE OF ACOUSTIC WAVEGUIDES

Cheng K. Jen, Brossard, and Gerald W. Farnell, Montreal, both of Canada, assignors to Canadian Patents & Development Ltd., Ottawa, Canada

Filed Feb. 9, 1987, Ser. No. 12,279
Claims priority, application Canada, Apr. 3, 1986, 505801
Int. Cl.[4] G03B *42/06*
U.S. Cl. 367—7 **7 Claims**

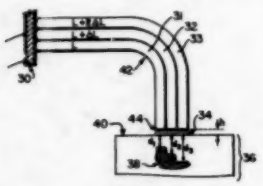
1. An ultrasonic imaging system for transmitting ultrasonic pulses into an object and detecting reflected ultrasonic waves from the object comprising:

electrical pulse generator means for producing electrical pulses;

transducer means for converting the electrical pulses to

ultrasonic pulses and also converting the reflected ultrasonic waves to electrical signals;

probe means for transmitting the ultrasonic pulses into the object and detecting the reflected ultrasonic waves from the object, the said probe means having a bundle of cladded acoustic waveguides, each of the acoustic waveguides having a core made of solid or a liquid material and a solid cladding thereabout, the bulk longitudinal and shear wave velocities of the material of the core being smaller than



those of the material of the cladding, and each of the said acoustic waveguides further having a different predetermined delay characteristic for introducing different delays in the ultrasonic pulses carried by each waveguide in that each of the said acoustic waveguides receives substantially only the reflected ultrasonic waves resulting from pulses transmitted by itself; and

display means for displaying acoustic discontinuities of the object in response to the electrical signals.

4,894,807

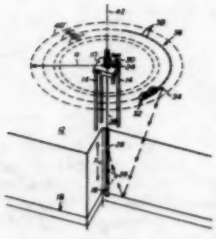
SIMULTANEOUS VERTICAL-SEISMIC PROFILING AND SURFACE SEISMIC ACQUISITION METHOD

M. Aftab Alam, Weybridge, England, and Akkas Manzur, Houston, Tex., assignors to Western Atlas International, Inc., Houston, Tex.

Filed Jun. 16, 1988, Ser. No. 152,969

Int. Cl.[4] G01V *1/20*

U.S. Cl. 367—15 **14 Claims**



4. A method of seismic exploration, comprising the steps of

(a) deploying at least one sensor in a borehole located at a predetermined depth;

(b) towing a seismic streamer cable behind a vessel steering a partial circle of predetermined radius and having an orbital focus located substantially above said borehole;

(c) generating seismic signals from a source associated with said vessel;

(d) receiving reflected seismic signals from said source at said at least one sensor located in said borehole while simultaneously receiving reflected seismic signals at s id streamer cable, said at least one sensor and said streamer cable providing an output indicative of the received seismic signals; and

(e) correlating the output indicative of the received seismic signals from a reflected subsurface horizon common to said at least one sensor and said streamer cable.

4,894,808

FLOW NOISE REDUCTION

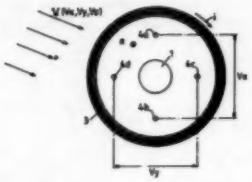
Mark Pedley, Cambridge, and William J. Fitzgerald, Madingley, both of England, assignors to The Marconi Company Limited, England

Continuation of Ser. No. 143,739, Jan. 13, 1988, abandoned. This application May 31, 1989, Ser. No. 359,220

Claims priority, application United Kingdom, Jan. 16, 1987, 8701067; Mar. 13, 1987, 8706076

Int. Cl.[4] G01V *1/36, 1/38*

U.S. Cl. 367—21 **5 Claims**



1. A method of reducing noise in the output signal of a pressure transducer, where the noise is caused by fluid flowing over the transducer, comprising the steps of:

(a) generating a pressure transducer output signal comprising both a wanted signal representative of an input acoustic signal to be detected, and an unwanted noise signal representative of fluid flow noise detected by said transducer;

(b) generating a fluid velocity noise signal representing the fluid velocity immediately adjacent said pressure transducer by providing a set of electrodes comprising two pairs of electrodes, each pair being spaced along a line perpendicular to a magnetic field, the line of one pair being perpendicular to the line of the other pair, so that the electric field induced by two perpendicular components of fluid flow is detectable;

(c) applying said fluid velocity noise signal to an adaptive filter to produce a corresponding fluid pressure noise signal according to an adaptive characteristic of said adaptive filter;

(d) subtracting said fluid pressure noise signal from said pressure transducer output signal to produce said wanted signal; and

(e) controlling said adaptive filter characteristic in dependence upon said wanted signal to minimize the error between said unwanted noise signal and said fluid pressure noise signal.

4,894,809

METHOD FOR BIN, MOVEOUT CORRECTION AND STACK OF OFFSET VERTICAL SEISMIC PROFILE DATA IN MEDIA WITH DIP

George P. Moeckel, Duncanville, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 737,352, May 23, 1985, Pat. No. 4,802,146, and a continuation-in-part of Ser. No. 737,356, May 23, 1985, Pat. No. 4,802,147. This application Jun. 13, 1988, Ser. No. 205,767

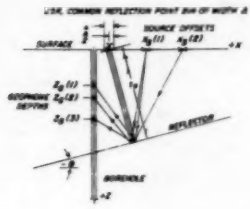
Int. Cl.[4] G01V *1/36*

U.S. Cl. 367—57 **10 Claims**

1. A method for binning, moveout correcting and stacking vertical seismic profile data for a dipping media comprising the steps of:

(a) receiving vertical seismic profile data from an acoustic pulse receiver located in a borehole beneath the earth's surface and horizontally offset from any acoustic pulse

generator on the surface causing acoustic pulses reflected from said dipping media to be received by said acoustic pulse receiver or receiving vertical seismic profile data from acoustic pulse receivers located on the earth's surface horizontally offset from a borehole containing an



acoustic pulse generator causing acoustic pulses reflected by said dipping media to be received by said acoustic pulse receivers located on the earth's surface;

(b) selecting zero source-receiver, common reflection point bins for said received vertical seismic profile data according to the following bin range criteria;

$$\text{for } \theta > 0, \text{ if } x_s(p) > z_G(k)\tan\theta \quad : \quad z_G(k)\tan\theta < X < \frac{x_s(p) + z_G(k)\tan\theta}{2};$$

$$\text{for } \theta > 0, \text{ if } x_s(p) < z_G(k)\tan\theta \quad : \quad \frac{x_s(p) + z_G(k)\tan\theta}{2} < X < a_G(k)\tan\theta;$$

$$\text{for } \theta > 0, \text{ if } x_s(p) = z_G(k)\tan\theta \quad : \quad X = x_s(p);$$

$$\text{for } \theta < 0, \text{ if } x_s(p) < z_G(k)/\tan|\theta| \quad : \quad z_G(k)\tan\theta < X < \frac{x_s(p) + z_G(k)\tan\theta}{2};$$

$$\text{for } \theta < 0, \text{ if } x_s(p) > z_G(k)/\tan|\theta| \quad : \quad \frac{x_s(p) + z_G(k)\tan\theta}{2} < X < x_s(p);$$

where

η = angle of dip for said media,

x = horizontal coordinate of VSP reflection loci,

x_s = source-wellhead offset distance on the surface,

z_G = the depth of the geophone in a borehole,

k = geophones 1, 2, . . . , k, and

p = shotpoints 1, 2, . . . , p;

(c) placing said received vertical seismic profile data in said zero source-receiver common reflection point bins determining a normal incidence two-way reflector time for said dipping media to provide boundaries for the time intervals of said zero source receiver common reflection point bins;

(d) moveout correcting said binned vertical seismic profile data;

(e) stacking said moveout corrected vertical seismic profile data in said zero source-receiver, common reflection point bins; and

(f) displaying said moveout corrected, zero source-receiver binned, vertical seismic profile data.

4,894,810

METHOD AND A DEVICE FOR MEASURING A DISTANCE BY MEANS OF ULTRASONIC PULSES

Esko H. Jukkala, Turku, Finland, assignor to Mikrovalmiste U.J. Pulkkanen Oy, Turku, Finland

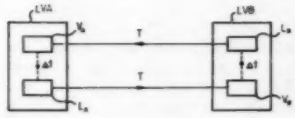
PCT No. PCT/F187/00014, § 371 Date Sep. 4, 1987, § 102(e) Date Sep. 4, 1987, PCT Pub. No. WO87/04527, PCT Pub. Date Jul. 30, 1987

PCT Filed Jan. 27, 1987, Ser. No. 99,920

Claims priority, application Finland, Jan. 28, 1986, 860394

Int. Cl.[4] G01S 3/80

U.S. Cl. 367—118 **4 Claims**



1. A method for measuring a distance between two points by means of ultrasonic pulses, comprising the steps of:

(a) sending an ultrasonic pulse (USP_1) by means of a transceiver (LVA) positioned at a point of origin to a target point, whereby a counter (8) in the transceiver (LVA) is started;

(b) receiving said ultrasonic pulse (USP_1) by a transceiver (LVB) positioned at the target point, whereby a first predetermined delay time of the transceiver (LVB) is started;

(c) sending an ultrasonic pulse (USP_2) by the transceiver (LVB) to the point of origin after said first determined delay time is finished, whereby a counter (8) in the transceiver (LVB) is started;

(d) receiving said ultrasonic pulse (USP_2) by means of the transceiver (LVA) at the point of origin, whereby a second predetermined delay time of the transceiver (LVA) is started simultaneously, the counter (8) thereof is stopped, and the measuring result is displayed in the transceiver (LVA);

(e) sensing an ultrasonic pulse (USP_3) by the transceiver (LVA) to the target point after said second predetermined delay time of the transceiver (LVA) is finished whereby the counter (8) thereof is started;

(f) receiving the ultrasonic pulse (USP_3) by means of the transceiver (LVB) at the target point, whereby said first predetermined delay time of the transceiver (LVB) is started simultaneously, and the counter (8) thereof is stopped,

characterized in that

said first predetermined delay time is equal to said second predetermined delay time, and equal frequencies are used in the transceivers (LV_A, LVB), whereby

(g) in step (f) the measuring result is displayed also in the transceiver (LVB) positioned at the target point; and

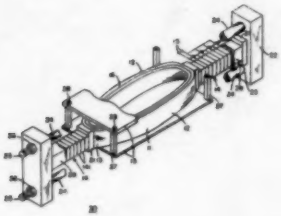
(h) the measuring is continued from step (c) until it is interrupted.

4,894,811

OUTBOARD-DRIVEN FLEXTENSIONAL TRANSDUCER

Raymond Porzio, Narragansett, R.I., assignor to Raytheon Company, Lexington, Mass.

Filed May 18, 1987, Ser. No. 51,336
Int. Cl.[4] H04R *17/00, 15/00*
U.S. Cl. 367—174 22 Claims



1. A flextensional transducer comprising:
a compressible shell having an inner and outer surface;
an electromechanical drive in contact with the outer external surface of said shell; and
means for compressing said drive against said shell.

4,894,812

REMOVABLE AND REUSABLE CAP WITH TIMEPIECE FOR A MODIFIED DISPOSABLE CIGARETTE LIGHTER

Eddie M. Wood, 6322 N. 47th Ave., Glendale, Ariz. 85301

Filed Jun. 29, 1989, Ser. No. 372,774
Int. Cl.[4] G04B *27/00*; F23Q *2/32*
U.S. Cl. 368—10 5 Claims

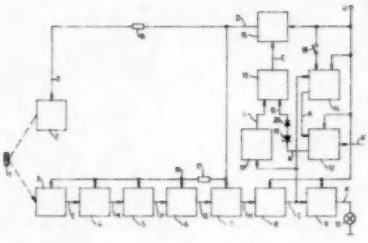
1. A disposable cigarette lighter and disposable cigarette lighter cap comprising:
a disposable cigarette lighter;
a disposable cigarette lighter cap with timepiece, with cooperative means for holding said timepiece to said cap, and cooperative means for pivoting and holding said cap on said lighter in apparent integrated unity, and cooperative means for removing said cap from said lighter simply by pulling said cap from said lighter.

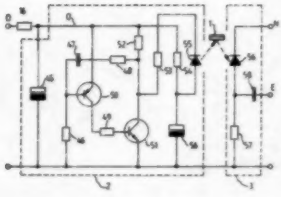
4,894,813

ALARM SHUT-OFF DEVICE, WITH A WAKE UP SIGNAL DELIVERING INTEGRATED CIRCUIT AND A RECEIVING AND SIGNAL SHAPING NETWORK

Lothar Pächer, Mainz, and Heinz Schiebelhuth, Frankfurt, both of Fed. Rep. of Germany, assignors to Braun Aktiengesellschaft, Kronberg, Fed. Rep. of Germany

Filed May 26, 1988, Ser. No. 199,155
Claims priority, application Fed. Rep. of Germany, Jun. 6, 1987, 3719087
Int. Cl.[4] G04C *21/16*
U.S. Cl. 368—256 20 Claims





1. An alarm shut-off device, in particular for an alarm clock or timer, with a clockwork containing an integrated circuit which, when the clock time matches the alarm time, delivers a wake-up signal to a signal generator preferably configured as an electroacoustic transducer, with a receiving and signal shaping network which includes a receiver sensitive to radiation a filter amplifier, and a threshold switching stage for receiving and further processing a shut-off signal issued by the user of the clock, means responsive to said wake-up signal for connecting said receiving and signal shaping network to its voltage supply following which said receiving and signal shaping network processes said shut-off signal such that its application to an input of said integrated circuit causes said circuit to interrupt the delivery of said wake-up signal,
said receiving and signal shaping network further including a rectifier and differentiator stage, said rectifier and differentiator stage including rectifier circuitry and a differentiator connected subsequent to said rectifier circuitry, the output signal of said differentiator being determined by the variation with time of the radiation detected by said receiver.

4,894,814

OPTICAL DISC PLAYER WITH PAUSE FUNCTION IN RESPONSE TO ELAPSED PRESET MAXIMUM PLAYBACK TIME PERIOD

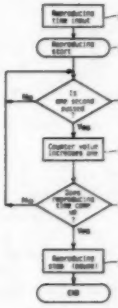
Jiro Yamada, Neyagawa; Susumu Kinoshita, Katano, and Haruhisa Tomoda, Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed May 21, 1987, Ser. No. 52,331

Claims priority, application Japan, May 23, 1986, 61-119741

Int. Cl.[4] G11B *7/085*

U.S. Cl. 369—19 **4 Claims**



1. An optical disc player comprising:

input means for entering a desired reproducing time period during which an optical disc is to be reproduced and a start signal by which reproduction of said optical disc is started;

optical pick-up means for reading optical digital signals stored in said optical disc and for issuing electric digital signals corresponding to said optical digital signals;

memory means for storing said desired reproducing time period;

disc reproducing means for controlling the position of said optical pick-up means;

timer means for counting elapsed time from the start of the reproduction of said optical disc at receipt of said start signal from said input means; and

logic processing means for comparing said desired reproducing time period stored in said memory means with said elapsed time counted by said timer means, and for issuing a control signal to said disc reproducing means for stopping said optical pick-up means on a position where it is at in a pausing state when said elapsed time coincides with said desired reproducing time period; and

said logic processing means includes causing restarting said disc reproducing means for controlling the position of said optical pick-up means from said position where said optical pick-up means is stopped when another start signal is entered by said input means.

4,894,815

OPTICAL HEAD FOR READING INFORMATION FROM A MAGNETOOPTIC RECORDING MEDIUM

Yutaka Yamanaka, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Apr. 1, 1988, Ser. No. 175,978

Claims priority, application Japan, Apr. 1, 1987, 62-81571

Int. Cl.[4] G11B *7/00*

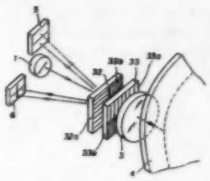
U.S. Cl. 369—112 **4 Claims**

1. An optical head for reading information from a magnetooptic recording medium, comprising:

a semiconductor laser device from which a light beam radiates;

an objective lens for focusing said light beam on said magnetooptic recording medium;

first and second optical gratings provided serially on a light axis of said light beam which is reflected from said magnetooptic recording medium, said first and second optical gratings diffracting said reflected light beam to supply first and second light beams having polarized components orthogonal to each other; and



first and second photodetectors for detecting said first and second diffracted light beams to read information stored in said magnetooptic recording medium, and to detect tracking and focusing errors.

4,894,816

OPTICAL INFORMATION RECORDING APPARATUS

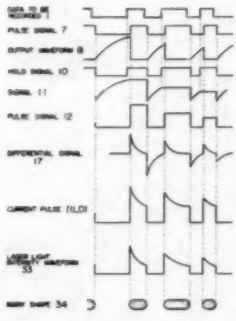
Hirofumi Sukeda, Kokubunji; Masahiro Ojima, Tokyo, and Atsushi Saito, Ichikawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 5, 1988, Ser. No. 152,803

Claims priority, application Japan, Feb. 12, 1987, 62-28248; Jun. 5, 1987, 62-139723

Int. Cl.[4] G01D *15/14*; G11B *21/10, 7/00*

U.S. Cl. 369—54 **15 Claims**



1. An optical information recording apparatus, in which binary information is recorded by irradiating recording medium with laser light pulses corresponding to pulses to be recorded so as to vary locally characteristics of the recording medium by thermal energy of the laser light pulses, comprising:

means for setting the light energy at the front and the rear end portions of said laser light pulse;

means for discriminating the interval between said pulses to be recorded; and

means for giving said means for setting the light energy a control signal controlling energy at the front end portion of each of said laser light pulses, depending on the output of said means for discriminating the interval.

4,894,817

METHOD OF WRITING DATA ON OPTICAL CARD BY PROJECTING THEREON INTENSITY MODULATED LIGHT BEAM

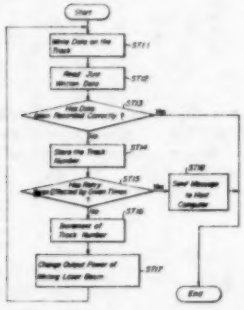
Hisakatsu Tanaka, Chofu; Takao Rokutan, Higashimurayama, and Nagahiro Gocho, Hachioji, all of Japan, assignors to Olympus Optical Co., Ltd., Japan

Filed Mar. 10, 1988, Ser. No. 166,380

Claims priority, application Japan, Mar. 16, 1987, 62-59068

Int. Cl.[4] G11B 7/125; G06K 5/00, 7/10

U.S. Cl. 369—54 **14 Claims**



1. A method of writing data on an optical card having a record layer on which a number of tracks are formed, by projecting a writing light beam whose output power is modulated in accordance with the data to be recorded, comprising the steps of:

(1) first writing the data in a track of the optical card with the aid of a light beam having a predetermined output power;

(2) reading the data just written on the optical card to derive reproduced data;

(3) checking the reproduced data to confirm whether the relevant data has been written on the optical card correctly or not;

(4) upon confirming that the relevant data has not been correctly written on the card, changing the output power of the writing light beam in a stepwise manner;

(5) repeating the writing of the relevant data in a different track on the optical card, after the output power of the writing light beam has been stepwise changed;

(6) repeating steps (2), (3), (4) and (5) until a repetition of step (3) confirms that the relevant data has been correctly written on the optical card; and

(7) subsequently recording data on an optical card using the same output power of the writing light beam as used in the last repetition of step (5) which confirmed that the relevant data had been correctly written on an optical card.

4,894,818

OPTICAL PACKET SWITCHING SYSTEM USING MULTI-STAGE COMBINATION OF LIGHT TRIGGERING SWITCHES

Masanobu Fujioka, Ohmiya, and Katsuyuki Utaka, Musashino, both of Japan, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Tokyo, Japan

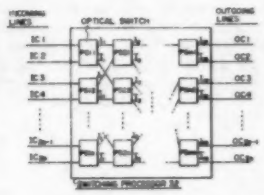
Filed Oct. 18, 1988, Ser. No. 259,157

Claims priority, application Japan, Oct. 22, 1987, 62-265386

Int. Cl.[4] H04B 9/00

U.S. Cl. 370—3 **5 Claims**

1. An optical packet switching system for switching optical packets each of which an information part and a packet end code of optical signals and an optical routing signal of a wavelength-multiplexed optical signal, the optical packet switching system comprising a switching network receptive of the optical packets and formed by a multi-stage combination of light triggering switches turned ON or OFF depending on the presence or absence respectively of a predetermined wavelength of the routing signal in the wavelength-multiplexed optical signal.



4,894,819

DATA TRANSMISSION METHOD IN OPTICAL STAR NETWORK AND OPTICAL STAR NETWORK SYSTEM FOR REALIZING THE SAME

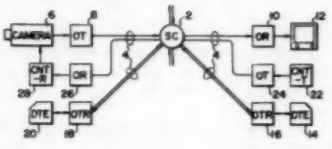
Toshinori Kondo, and Takao Okikawa, both of Tokyo, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 7, 1988, Ser. No. 241,266

Claims priority, application Japan, Sep. 9, 1987, 62-225510; Sep. 14, 1987, 62-230001

Int. Cl.[4] H04J 3/26

U.S. Cl. 376—4 **18 Claims**



1. An optical star network system wherein a first packet is transmitted between first and second terminals, which are functionally coupled to an optical star network, using a predetermined wavelength band in accordance with a CSMA/CD (Carrier Sense Multiple Access/Collision Detection) system, said optical star network system comprising:

generation means in a third terminal for generating a second packet having a predetermined bit length and including dummy data, a bit length of said dummy data being greater than a maximum bit length of said first packet which is transmitted before interruption of transmission of said first packet, when collision of said first and second packets occurs, the predetermined bit length of said second packet being not equal to an integer multiple of a bit length of a data unit of said first packet; and

transmission means for transmitting said second packet to a fourth terminal through a transmission path using said predetermined wavelength band.

4,894,820

DOUBLE-TALK DETECTION IN AN ECHO CANCELLER

Ryoichi Miyamoto; Yoshio Itoh; Yoshikazu Nakano; Mitsuo Tsujikado, and Kenichiro Hosoda, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Mar. 21, 1988, Ser. No. 171,487

Claims priority, application Japan, Mar. 24, 1987, 62-69589; Mar. 26, 1987, 62-72748; Jun. 30, 1987, 62-163654

Int. Cl.[4] H04B 3/23

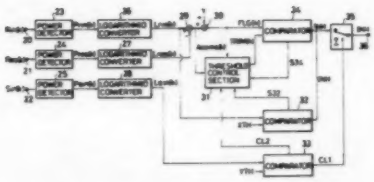
U.S. Cl. 370—32.1 **4 Claims**

1. A method of double-talk detection in an echo canceller

that uses an adaptive digital filter to adaptively estimate, from a received signal and a transmitted signal to which an echo signal of the received signal is added, the characteristics of an echo path and generate an echo replica signal, and substracts this echo replica signal from the transmitted signal in order to transmit a residual signal from which the echo signal has been removed, and which during the course of this operation detects a double-talk state according to a double-talk detection threshold and inhibits the adaptive estimation by the adaptive digital filter, wherein:

a determination is made as to whether the received signal is active or idle and, if it is idle, the adaptive estimation by the adaptive digital filter is inhibited and the double-talk detection threshold is held constant;

if the received signal is active, a determination is made as to whether the echo signal is active or idle, and if the echo



signal is idle, the inhibition of the adaptive estimation by the adaptive digital filter is cleared and the double-talk detection threshold is rapidly reduced;

if the received signal is active and the echo signal is active, the levels of the received signal and residual signal are determined, a margin is added to the difference between them, the result is compared with the double-talk detection threshold, and if the former is less than the latter, the double-talk state is detected and the adaptive estimation by the adaptive digital filter is inhibited, whereas if the former is greater than the latter, the single-talk state is detected and the inhibition of the adaptive estimation by the adaptive digital filter is cleared; and

the double-talk detection threshold is updated while the adaptive digital filter is estimating, in accordance with integration of its past values, the received signal, and the residual signal.

4,894,821

TIME DIVISION SWITCHING SYSTEM WITH TIME SLOT ALIGNMENT CIRCUITRY

Shin-Ichiro Hayano, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Sep. 28, 1987, Ser. No. 101,759

Claims priority, application Japan, Sep. 30, 1986, 61-233632; Jan. 7, 1987, 62-2240

Int. Cl.[4] H04Q *11/04*

U.S. Cl. 370—58.1 **26 Claims**

1. A time division switching system comprising:

a space switch;

a reference pulse generator for generating reference timing pulses at constant intervals;

means for controlling said space switch in response to said reference timing pulses;

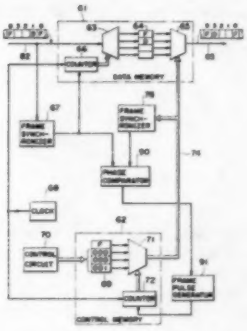
a plurality of input lines;

first and second variable phase pulse generators for generating first and second trains of variable phase timing pulses;

processing means for processing data signals on a first group of said input lines in response to the timing pulses of said first train to produce a first time division multiplexed (TDM) signal and processing data signals on a second group of said input lines in response to the timing pulses of said second train to produce a second TDM signal;

first and second highways for carrying said first and second TDM signals respectively to said space switch; and

timing control means for detecting time differences between said first and second variable phase timing pulses from said pulse generators and said reference timing pulses and



respectively controlling said first and second variable phase pulse generators in accordance with the detected differences so that the timing of each of said first and second TDM signals coincides with each other in said space switch.

4,894,822

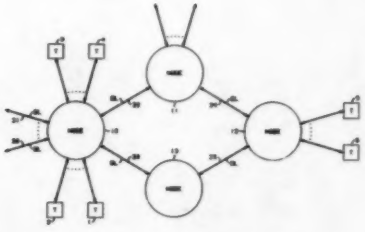
FAST PACKETIZED DATA DELIVERY FOR DIGITAL NETWORKS

Rolfe E. Buhrke, Westchester; James A. Davis, Glen Ellyn, all of Ill., and Douglas A. Spencer, Boulder, Colo., assignors to AT&T Information Systems American Telephone and Telegraph Company, Holmdel, N.J.

Filed Nov. 24, 1987, Ser. No. 126,074

Int. Cl.[4] H04Q *11/04*

U.S. Cl. 370—60 **41 Claims**



1. In a data communication network comprising a plurality of data switching points, a method of transmitting packetized digital information from a source terminal to a destination terminal comprising the steps of:

responsive to a request for setting up a data connection from said source terminal to said destination terminal, selectively assigning to one of said plurality of data switching points in a data path between said source and said destination terminals a mode indicator; and

responsive to reception of said packetized digital information in said one of said plurality of data switching points of said data path, executing one of a plurality of sequences of program steps identified by said mode indicator for processing said packetized digital information.

4,894,823

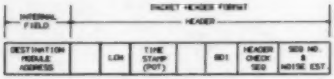
TIME STAMPING FOR PACKET SYSTEM NODES

Harry W. Adelmann, Neptune, and James D. Tomcik, Aberdeen, both of N.J., assignors to American Telephone and Telegraph Company, New York, N.Y. and AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 834,617, Feb. 28, 1986, abandoned. This application Sep. 11, 1987, Ser. No. 96,754

Int. Cl.[4] H04Q *11/04*

U.S. Cl. 370—60 8 Claims



1. Apparatus for measuring packet delay in a network node, the packet including a header having a time stamp field, the apparatus comprising,

means for generating a local time signal,

means for generating a packet originate time value representative of the difference between the local time signal value upon the packet entering the network node and a time stamp value from the packet header time stamp field, and

means for inserting said packet originate time value in the packet header time stamp field.

4,894,824

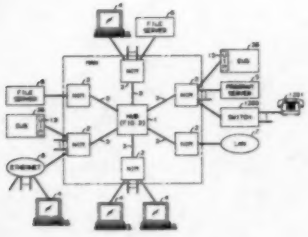
CONTROL NETWORK FOR A RAPID CONNECTION CIRCUIT SWITCH

Jayant G. Hemmady, Naperville; Michael J. Knudsen, Wheaton; Robert K. Nichols, Glen Ellyn; Gaylord W. Richards, Naperville, and Gary A. Roediger, Downers Grove, all of Ill., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Mar. 31, 1988, Ser. No. 175,543

Int. Cl.[4] H04Q *11/04*

U.S. Cl. 370—58.3 12 Claims



1. In a distributed control circuit switch, a method of sending requests from a plurality of requesters to a plurality of network controllers for controlling said switch comprising the steps of:

transmitting a request comprising an identity of an output link of said circuit switch from a requester to one of said plurality of network controllers and making resources of said requester unavailable;

testing for the availability of said output link in said one controller; and

when said testing step indicates that said output link is unavailable, transmitting an output link busy indication from said one controller to said requester for making said resources of said requester available.

4,894,825

FREQUENCY-DIVISION MULTIPLEX BROADBAND MULTIMEDIA NETWORK

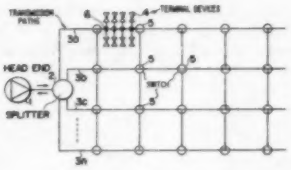
Hiroshi Kobayashi, Tokyo; Hideaki Haruyama, and Kazuyoshi Ozawa, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 140,793, Jan. 5, 1988, abandoned. This application May 15, 1989, Ser. No. 353,141

Claims priority, application Japan, Jan. 12, 1987, 62-3324

Int. Cl.[4] H04J *1/00*; H04H *1/02*

U.S. Cl. 370—124 11 Claims



1. An information communication network comprising:

a head end;

a plurality of information transmission paths coupled through said head end;

a plurality of terminal devices respectively connected to said plurality of information transmission paths;

transmission path switches, at least one transmission path switch being connected to each of said plurality of information transmission paths, and switching between one transmission path corresponding thereto and another information transmission path;

wherein said network has a tree topology wherein a head end side corresponds to an upstream side and a terminal device side corresponds to a downstream side, and each of said transmission path switches comprises transmission path monitor means for monitoring one of said information transmission paths, and, when its transmission path is in an abnormal operating state, outputting a detection signal indicating so;

switch means, responsive to the detection signals from said transmission path monitor means, for connecting a portion of the corresponding information transmission path downstream of the corresponding transmission path switch to another information transmission path;

a current source for supplying a current to the downstream side of the information transmission path;

current value detection means for monitoring a current value from said current source, and outputting a detection signal upon detecting that the current value is below a predetermined value; and

second switch means, responsive to the detection signal from said current value detection means, for disconnecting the downstream portion of the information transmission path.

4,894,826

MESSAGE GENERATING COMMUNICATION APPARATUS HAVING A MESSAGE PREAMBLE FORMAT ALLOWING PARTS OF CERTAIN MESSAGES TO BE IGNORED

John R. Aggers, Apple Valley, and Roger R. Roth, Minnetonka, both of Minn., assignors to Honeywell, Inc., Minneapolis, Minn.

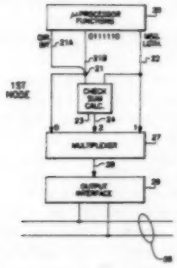
Filed Jan. 30, 1989, Ser. No. 303,417

Int. Cl.[4] H04J *3/16*

U.S. Cl. 370—85.1 3 Claims

1. In a communications network system of the type having a plurality of nodes all connected to a single data bus comprising an electrically conductive path, at least a first one of said nodes of the type for transmitting on the data bus to the other nodes electrical signals serially encoding a plurality of messages each

comprising a variable number of digits, each digit of which occupies a predetermined time interval, some of said messages including destination node addresses and message codes; and a plurality of second nodes each having a unique network address, and each having a processing element and an input interface element, said input interface element selectively supplying or denying to the processing element the messages transmitted on the data bus by the first node accordingly as a byte interrupt disable signal received by said interrupt interface element has respectively a first or second value, and responsive to equality between a destination node address within a message and a second node's network address, accepting the message and performing predetermined processing according to the message code, wherein the improvement comprises in each first node, preamble-generating apparatus for providing in each message sent by the node a preamble having a predetermined format signifying the presence of a message, comprising preamble generating means for providing a signal encoding the preamble and including in determined positions therein a sequence containing preselected preamble identification digits, a variable message type code which may have a plurality of values, the first of which specifying that the message is not directed to the second node, a message length value specifying the number of digits in the message, and a first redundancy value of a predetermined mathematical function of the numeric value of the preamble identification digits, the message type code, and the message length value; and wherein the improvement further comprises in each second node, apparatus receiving each message sent on the data bus, comprising



(a) preamble-detecting means connected to the input interface element, for receiving from the input interface element the signals on the data bus from the first node, and (i) for testing successive digit sequences encoded therein for equality to the identification digits, (ii) for using preselected preamble identification digits, a message type code, and a message length value from the successive digit sequences encoded therein to calculate a second redundancy value using the predetermined mathematical function and for testing the second redundancy value equal to the first redundancy value from the successive digit sequences, and (iii) for testing the variable message type code for equality to its first value, and responsive to equality in all three tests for a specific sequence of successive digits, for providing a preamble present signal having a second value and the message length value within said specific sequence, the preamble present signal having a first value otherwise; and

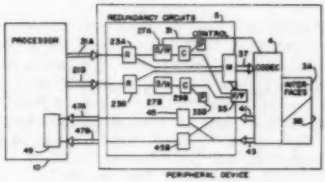
(b) timer means receiving the message length value and the preamble present signal from the preamble-detecting means for providing a digit interrupt disable signal to the input interface, said digit interrupt disable signal responsive to the preamble present signal having its second value for a duration corresponding to the message length value and its first value otherwise.

4,894,827

REDUNDANCY AND BUFFERING CIRCUITS

John Ramsay; Thomas Quellette, both of Herndon, and Richard N. Deglin, Reston, all of Va., assignors to International Telesystems Corporation, Herndon, Va.

Filed Mar. 2, 1988, Ser. No. 163,243
Int. Cl.[4] G06F *11/00*
U.S. Cl. 371—8.2 **12 Claims**



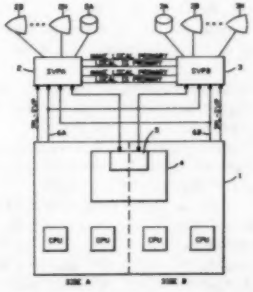
1. Redundancy and buffering circuit apparatus for connecting between peripheral devices and processors comprising first and second identical processor output buses, first and second identical receivers individually connected to the first and second output buses, a multiplexer having inputs and outputs, the multiplexer inputs being connected to outputs of the first and second receivers, and peripheral device inputs connected to the multiplexer outputs, first and second shift registers connected respectively to the first and second receivers, first and second comparators having strapped signals and connected respectively to the first and second shift registers, a flip-flop connected to the first and second comparators and to the multiplexer for receiving signals from the comparators and for controlling state of the multiplexer and for providing signals from the multiplexer outputs according to the received signals from the comparators.

4,894,828

MULTIPLE SUP SWAP MECHANISM

Robert Novy, Redwood City; Richard Guyon, Mt. View, both of Calif., and Moreno A. Chimenti, Rome, Italy, assignors to Amdahl Corporation, Sunnyvale, Calif.

Filed Dec. 22, 1987, Ser. No. 136,409
Int. Cl.[4] G06F *11/20*
U.S. Cl. 371—11.3 **18 Claims**



9. In a data processing system having at least one main processor performing system tasks and a plurality of service processors, including a first service processor performing primary service functions and a second service processor performing secondary service functions, apparatus for providing service facilities from said service processors, comprising:

first means in said main processor for detecting a failure indication in said first service processor; and

second means responsive to said failure indication for trans-

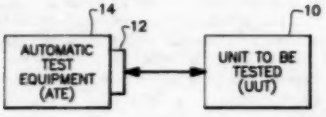
ferring said primary service functions from said first service processor to said second service processor.

4,894,829

COMPREHENSIVE DESIGN AND MAINTENANCE ENVIRONMENT FOR TEST PROGRAM SETS

Vijaykumar S. Monie, Edina; Elaine N. Frankowski, Minneapolis; James A. Larson, Roseville; Stephen V. Metz, St. Paul; Mohammed Nasiruddin, St. Louis Park; Michael D. Reed, Minneapolis; Rose Mae M. Richardson, Roseville; Orvil E. Wilsey, Dayton, and William T. Wood, Crystal, all of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Apr. 21, 1988, Ser. No. 184,536
Int. Cl.[4] G06F *11/00*
U.S. Cl. 371—20.1 6 Claims



1. A source computer program for generating an object computer program for use in operating a particular automatic test equipment unit (ATE), said ATE being useable for testing a variety of electrical equipment type units each of which is referred to with relation to said ATE as a unit under test (UUT); said UUT being characterized by having labeled input, output and load terminals; said ATE being characterized by having a variety of power and signal stimuli resources with associated parameter values, a variety of sensor resources with associated parameter values, a variety of load applying resources with associated parameter values, and a computer facility which is programmable to apply parameter modified ones of said resources to selected ones of said terminals of said UUT to perform various desired tests on said UUT; said source program comprising:

lists of resources and respectively associated parameter values indexed relative to said resources of said ATE;

a database structure for storing data;

associated operational coding means for each of said resources of said lists to effect a programmed operation thereof;

interactive graphical facilities formatted to facilitate:

(1) selecting the identities of desired ones of said resources from said lists;

(2) selecting the identities of desired ones of said associated parameter values from said lists to define parameter modified ones of said resources;

(3) storing said identities of selected ones of said resources and selected ones of said parameter values in said database structure;

(4) selecting and storing in said database structure labels for said identities of said parameter modified resources corresponding to said UUT labeled input, output and load terminals;

conversion program means for accessing data in said database structure and utilizing said data to automatically generate an object program for use in operating a particular ATE by incorporating therein said associated operational coding means for operating selected ones of said parameter modified resources; and

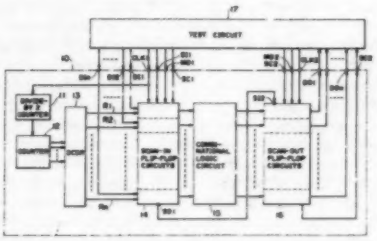
means for assembling and ordering said desired tests to form said object program.

4,894,830

LSI CHIP WITH SCANNING CIRCUITRY FOR GENERATING REVERSALS ALONG ACTIVATED LOGICAL PATHS

Masato Kawai, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jan. 19, 1988, Ser. No. 145,069
Claims priority, application Japan, Jan. 17, 1987, 62-7442
Int. Cl.[4] G01R *31/28*
U.S. Cl. 371—22.3 4 Claims



1. An integrated circuit chip comprising:

scanning means for generating a scanning pulse at one of a plurality of terminals and successively shifting said scanning pulse from said one terminal to the next at clock intervals;

a plurality of first flip-flops respectively associated with said terminals;

a logic circuit having a plurality of inputs coupled respectively to outputs of said first flip-flops and a plurality of logical paths between said inputs thereof and a plurality of outputs thereof, said logical paths being activated when said first flip-flops assume a predetermined logic state;

a plurality of first data loading means respectively coupled between a respective one of said terminals and a respective one of said scan-in flip-flops, said data loading means being operable during a test mode for loading scan data into said first flip-flops to cause same to assume said predetermined logic state to thereby activate said logical paths and causing each of said flip-flops to momentarily change state in response to said scanning pulse, whereby successive reversals occur in the loaded scan data, resulting in propagation of a signal through each of said activated logical paths, said data loading means being further operable during a normal mode for loading normal data into said first flip-flops;

a plurality of second flip-flops; and

a plurality of second loading means respectively coupled between a respective one of said outputs of said logic circuit and a respective one of said second flip-flops for loading output data of said logic circuit into said second flip-flops and causing said second flip-flops to generate a serial output during said test mode and parallel outputs during said normal mode.

4,894,831

LONGITUDINALLY PUMPED LASER OSCILLATOR

Anthony J. Alfrey, Half Moon Bay, Calif., assignor to Spectra-Physics, San Jose, Calif.

Filed Sep. 7, 1988, Ser. No. 241,698
Int. Cl.[4] H01S *3/098*
U.S. Cl. 372—19 11 Claims

1. An apparatus for generating cavity mode, comprising:

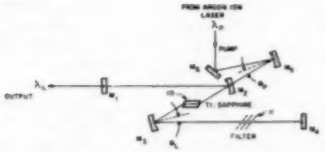
a resonant cavity supporting a cavity mode along a resonant path, the cavity characterized by a segment of the resonant path in which the cavity mode is astigmatic;

a laser medium mounted within the segment of the resonant

path so that a volume of the astigmatic cavity mode within the laser medium defines a cavity mode volume;

means, mounted with the resonant cavity, for supplying a pump beam having a wavelength different from the cavity mode;

astigmatic focusing means, mounted at a preselected angle of incidence with the pump beam, for focusing the pump



beam along a longitudinal axis to define a pumped volume in the laser medium, such that the best average match of the pumped volume and the cavity mode volume within the laser medium is achieved to thereby maximize output power from the laser medium; and

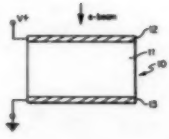
means, mounted with the resonant cavity, for abstracting energy from the cavity mode to produce an output beam.

4,894,832

WIDE BAND GAP SEMICONDUCTOR LIGHT EMITTING DEVICES

Sel B. Colak, Ossining, N.Y., assignor to North American Philips Corporation, New York, N.Y.

Filed Sep. 15, 1988, Ser. No. 244,379
Int. Cl.[4] H01S 3/19
U.S. Cl. 372—44 **18 Claims**



1. Wide band gap, single conductivity type semiconductor light emitting device, the device having at least two electrodes and an active region between the electrodes, the active region including a carrier recombination region and comprising an essentially single crystal semiconductor compound of a single conductivity type selected from the group of II-VI and III-V semiconductor compounds and mixed compounds, characterized in that separate means for carrier introduction into the active region is provided, whereby in operation, application of a bias potential across the electrodes below that required for carrier multiplication by avalanche breakdown enables excitation of light emission by separate carrier introduction at a lower energy than would be required without the bias potential.

4,894,833

SURFACE EMITTING LASERS WITH COMBINED OUTPUT

Donald B. Carlin, West Windsor Township, Mercer County, N.J., assignor to General Electric Company, Schenectady, N.Y.

Filed Aug. 9, 1988, Ser. No. 230,105
Int. Cl.[4] H01S 3/19
U.S. Cl. 372—44 **3 Claims**

1. A surface emitting semiconductor laser device for emitting an output light signal perpendicular to a major surface thereof, comprising:

a substrate having first and second opposing major surfaces;

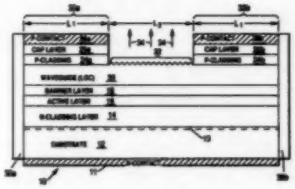
first contact means over said first major surface of said substrate;

first and second longitudinally spaced apart and laterally aligned laser regions defining a central region therebetween and said laser regions being disposed on said second major surface of said substrate;

an optical medium extending over the central region and the first and second laser regions through which light generated by the first and second laser regions propagates;

a capping laver and second contact means overlying the optical medium;

a single optical grating surface etched into the second contact means and the capping layer to extend over said



central region in optical communication with the optical medium to define said major surface of said laser device wherein the first and second laser regions are disposed on opposing sides longitudinally of the grating surface, said grating surface having grating periods for phase locking and combining the light propagations in the optical medium and generated by said first and second laser regions and for allowing said output light signal to be emitted therethrough perpendicular to said major surface of said laser device; and

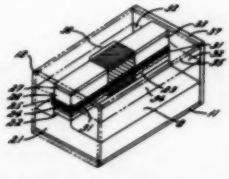
wherein the first and second laser regions each comprise a plurality of laterally aligned phase-locked lasers disposed on said second major surface of said substrate with corresponding spaced-apart lasers of each of the first and second longitudinal laser regions being longitudinally aligned.

4,894,834

SEMICONDUCTOR LASER AND METHOD FOR PRODUCTION THEREOF

Syoichi Kakimoto; Masatoshi Fujiwara, and Syogo Takahashi, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Mar. 9, 1989, Ser. No. 321,529
Claims priority, application Japan, Mar. 16, 1988, 63-64521
Int. Cl.[4] H01S 3/19
U.S. Cl. 372—44 **10 Claims**



1. A distributed feedback semiconductor laser comprising, in combination, an active layer associated on one side with a corrugated light guide and on the other side with a cladding layer, the cladding layer and corrugated light guide being of

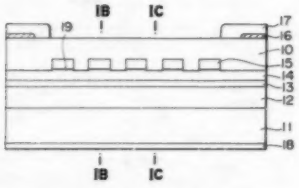
opposite conductivity types, the active layer being a multi-quantum well having alternating well and barrier layers, the active layer, light guide and cladding layers being formed into a stripe having a longitudinal axis perpendicular to the corrugations, and phase shift means in the active layer for introducing a phase shift, said phase shift means comprising a relatively small length of the active layer stripe in which the multi-quantum well is disordered by impurity diffusion thereby altering the propagation constant in the disordered length.

4,894,835

SURFACE EMITTING TYPE SEMICONDUCTOR LASER

Kazuhisa Uomi, Hachioji; Shinji Tsuji, Saitama; Makoto Okai, Koganei; Shinji Sakano, Hachioji, and Naoki Chinone, Chofu, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 27, 1988, Ser. No. 249,870
Claims priority, application Japan, Sep. 30, 1987, 62-243730
Int. Cl.[4] H01S 3/19
U.S. Cl. 372—45 **12 Claims**



1. In a semiconductor laser of the surface emitting type comprising:

a substrate; and

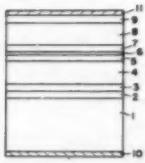
a plurality of semiconductor layers stacked on the substrate, wherein the semiconductor layers include a light emitting region which has a plurality of strips regions and gap regions each placed between adjacent stripe regions, the stripe regions being optically coupled to each other through the gap regions, an active region which radiates light, and two semiconductor layers with smaller refractive indexes than the active region located above the below the active region; the light emitting region has 2N-th order gratings where N is an integer, wherein the grating is formed in at least one of the two layers above and below the active region.

4,894,836

SEMICONDUCTOR DEVICE

Toshiro Hayakawa, Nara; Takahiro Suyama; Masafumi Kondo, both of Tenri, and Kosei Takahashi, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Feb. 24, 1988, Ser. No. 159,797
Claims priority, application Japan, Feb. 24, 1987, 62-42258
Int. Cl.[4] H01S 3/19
U.S. Cl. 372—45 **2 Claims**



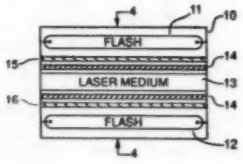
1. In a semiconductor device using the quantum effect of one dimension, said device comprising a substrate, a first electrode formed under said substrate, a device structure selected from a quantum well structure, a superlattice structure, and a modulation-doped heterostructure disposed on said substrate, and a second electrode formed on said device structure, the device wherein said quantum effect of one dimension based on said device structure arises in the direction vertical to the plane of said substrate on which said device structure is disposed, and wherein the plane of said substrate is substantially the (111) plane, where said quantum well structure comprises successively a first cladding layer, a quantum well layer having a thickness of about 100 Å or less, and a second cladding layer; said superlattice structure including a multiple well structure comprises a first cladding layer, a multi-layered well layer comprising alternate layers of well layers and barrier layers having a thickness of about 200 Å or less formed on said first cladding layer, and a second cladding layer formed on said multi-layered well layer; and said modulation-doped heterostructure comprises an undoped layer of a first semiconductor, an undoped spacing layer of a second semiconductor having a thickness of about 200 Å or less formed on said undoped layer, and a doped carrier supplying layer of the second semiconductor formed on said undoped spacing layer.

4,894,837

ABSORBING FILTER IN PUMP CAVITY FOR CONTROL OF BEAM QUALITY

John C. DiFonzo, San Mateo County, and Bertram C. Johnson, Sunnyvale, both of Calif., assignors to Spectra-Physics, San Jose, Calif.

Filed Nov. 18, 1988, Ser. No. 273,210
Int. Cl.[4] H01S 3/93
U.S. Cl. 372—72 **37 Claims**



1. An apparatus for amplifying coherent radiation propagating along an optical path, comprising:

a laser medium mounted along the optical path, the medium exhibiting thermally induced distortions;

a flash lamp, mounted adjacent the laser medium outside of the optical path to provide laser pumping radiation for the laser medium, the lamp having an output spectrum characterized by a first band with low fluorescence efficiency in the laser medium, and a second band with high fluorescence efficiency in the laser medium;

a filter mounted between the flash lamp and the laser medium for absorbing the first band of the output spectrum of the lamp to control the thermally induced optical distortions in the laser medium while transmitting the second band; and

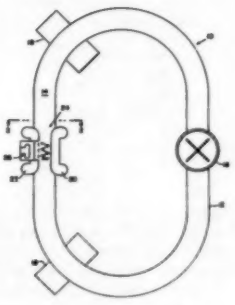
a pump cavity enclosing the laser medium, flash lamp and filter with a liquid cooling medium flowing through the cavity to remove heat; wherein the filter includes a coating resistive to the cooling medium.

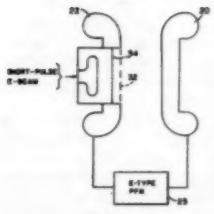
4,894,838

ELECTRON BEAM PREIONIZATION OF A HIGH PRESSURE SELF-SUSTAINING GAS LASER

Robert Kraft, 79 Glenmere Cir., Reading, Mass. 01867, and Victor H. Hasson, 12 Madison Ave., West, Winchester, Mass. 01890

Filed Oct. 19, 1988, Ser. No. 259,687
Int. Cl.[4] H01S 3/03
U.S. Cl. 372—86 8 Claims





1. In a high pressure self-sustained laser having a gaseous medium, an endless duct for containing said gaseous medium, heat exchangers disposed adjacent said duct for cooling said gaseous medium, and blower means disposed to circulate said gaseous medium through said duct, the improvement comprising:

(a) electrode means comprising an anode and a cathode disposed parallel to each other within opposite walls of said duct for exciting the atoms and molecules of said gaseous medium to cause it to lase and to generate a laser beam along an optical axis; and

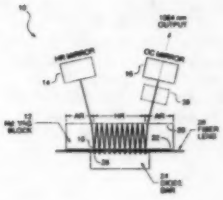
(b) an electron beam transfer disposed adjacent one of said electrodes outside of said duct for transmitting a short-pulse electron beam perpendicularly through one of said electrodes to preionize the gaseous medium between said electrodes, said electron beam also being transmitted perpendicularly to said optical axis of the laser beam generated by said laser.

4,894,839

HIGH EFFICIENCY MODE-MATCHED SOLID-STATE LASER WITH TRANSVERSE PUMPING

Thomas M. Baer, Mountain View, Calif., assignor to Spectra-Physics, Inc., San Jose, Calif.

Continuation of Ser. No. 103,557, Sep. 30, 1987, which is a continuation-in-part of Ser. No. 35,530, Apr. 7, 1987, which is a continuation-in-part of Ser. No. 811,546, Dec. 19, 1985, Pat. No. 4,656,635, which is a continuation-in-part of Ser. No. 730,002, May 1, 1985, Pat. No. 4,653,056. This application Aug. 11, 1988, Ser. No. 231,192
Int. Cl.[4] H01S 3/081
U.S. Cl. 372—93 25 Claims



1. A mode matched diode pumped solid state laser, comprising:

a block of laser material having a pair of opposed sides,

adjustable cavity forming means positioned around the block to define a laser cavity having a tightly folded zig-zag resonator portion within the block between the opposed sides having vertices at an adjustable preselected fold angle,

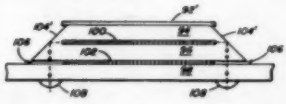
a plurality of laser diode pumping sources positioned adjcent to at least one of the opposed sides and substantially aligned with the vertices of the zig-zag portion of the resonator the fold angle being steep, and selected to substantially match the mode volume in the cavity with diverging pump radiation from said laser diode pumping sources.

4,894,840

SURFACE EMITTING LASER

Zong-Long Liau, Arlington, and James N. Walpole, Concord, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation of Ser. No. 109,945, Oct. 19, 1987, Pat. No. 4,784,722, which is a continuation of Ser. No. 693,207, Jan. 22, 1985, Pat. No. 4,718,070. This application Jun. 27, 1988, Ser. No. 211,888
The portion of the term of this patent subsequent to Jan. 5, 2005, has been disclaimed.
Int. Cl.[4] H01S 3/19
U.S. Cl. 372—108 16 Claims



1. In a surface emitting laser, the improvement comprising:

(a) an active region formed in a semiconductor body extending longitudinally in a plane to a light emitting edge at the end of said region;

(b) a smooth light reflective surface in said body opposite said edge for redirecting light emitted from said edge in a direction normal to said active region;

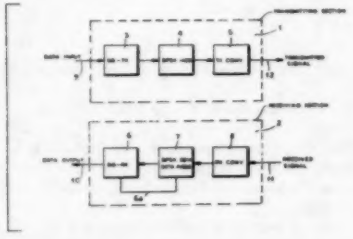
(c) a lens formed in said body in the path of said redirected light for collimating said light.

4,894,841

DIGITAL DIRECT-SEQUENCE SPREAD-SPECTRUM MODEM

Francesco Martinino, Campobasso; Andrea Pugnaloni, and Maurizio Tripodi, both of Rome, all of Italy, assignors to Selenia Spazio S.P.A., L'Aquila, Italy

Filed Jun. 23, 1988, Ser. No. 210,725
Claims priority, application Italy, Jun. 26, 1987, 48114 A/87
Int. Cl.[4] H04L 9/00
U.S. Cl. 375—1 **11 Claims**



1. A digital direct-sequence spread-spectrum modem comprising:

a transmitting section having an information input and a transmitted-signal output and, between said information input and said transmitted-signal output, in sequence:

a base band transmitter including a base band code generator for translation of an input data sequence generated by an external source connected to said information input into a coded signal sequence to be transmitted,

a BPSK modulator connector to said base band transmitter for digital BPSK modulation of said coded signal sequence to be transmitted, and

a frequency shifter connected to said BPSK modulator for shifting the BPSK modulated coded signal sequence to be transmitted from a carrier frequency to a standard intermediate frequency; and

a receiving section having a received-signal input and an information output and, between said received-signal input and said information output, in sequence;

a frequency shifter connected to said received signal input for shifting a standard intermediate frequency of a received signal to a carrier frequency for spread spectrum operation,

a BPSK data-aided demodulator fully under microprocessor algorithm control connected to the frequency shifter of said receiving section for direct coherent demodulation of the received signal to a BPSK standard, and

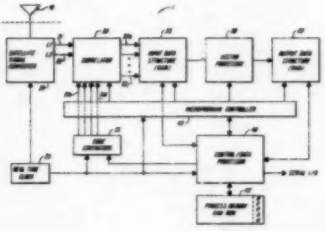
a base band processor connected to said BPSK data-aided demodulator for extracting a data sequence from the demodulated received signal and delivering said data sequence to said information output, said receiving section being provided with microprocesor means controlling carrier code recovery clock and data extraction correlation in accordance with microprocessor control algorithms wholly digitally.

4,894,842

PRECORRELATION DIGITAL SPREAD SPECTRUM RECEIVER

Paul V. Broekhoven, Needham; Daniel Fitzmartin, Newton; Paul Blasche, Arlington; Duncan B. Cox, Jr., Manchester, and Triveni Upadhyay, Burlington, all of Mass., assignors to The Charles Stark Draper Laboratory, Inc., Boston, Mass.

Filed Oct. 15, 1987, Ser. No. 108,922
Int. Cl.[4] H04K 1/02
U.S. Cl. 375—1 **7 Claims**



1. A direct sequence spread spectrum RF receiver for receiving and processing an RF signal having plural modulated channel component RF signals broadcast from plural sources, each channel component RF signal being a spread spectrum signal modulated in accordance with channel code, wherein the receiver comprises

A. means for receiving said plural component RF signals and forming from said component RF signals a linear composite RF signal,

B. baseband converter means for converting said linear composite RF signal to a baseband signal,

N-bit digitizing means for converting said baseband signal to a succession of N-bit digital signals at a sampling frequency, each digital signal being representative of a corresponding value of said baseband signal,

D. code generator means for generating a plurality of offset local code signals,

E. a correlator for correlating said N-bit digital signals with said plurality of offset local code signals and for producing plural digital signal/code correlation signals, each said signal/code correlation signal being representative of the correlation of said N-bit digital signal with a local code signal having a different offset, and

F. tracking means responsive to said correlation signals for tracking the code state and carrier of a component of said baseband signal derived from a modulated channel component RF signal broadcast from a single source.

4,894,843

DATA COMMUNICATION SYSTEM

Takehiro Yoshida, and Takuji Nakatsuma, both of Tokyo, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 6, 1986, Ser. No. 915,430
Claims priority, application Japan, Oct. 7, 1985, 60-221882; Oct. 25, 1985, 60-239037; Aug. 14, 1986, 61-191482
Int. Cl.[4] H04N 1/21, 1/32
U.S. Cl. 375—8 **16 Claims**

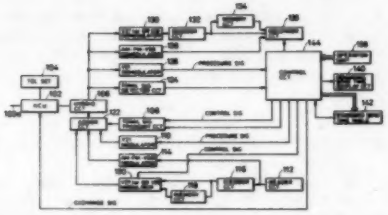
1. A data communication apparatus comprising:

data communication means for performing data communication;

calculation means for calculating a time required for the completion of the data communication on the basis of the amount of data to be communicated by said data communication means; and

display means for displaying the remaining time required for

completing the data communication for the data which is then being processed by said data communication means



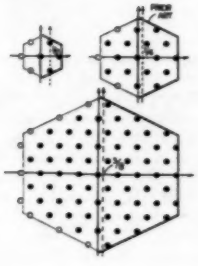
in response to the time calculated by said calculation means.

4,894,844

SIGNAL CONSTELLATIONS

George D. Forney, Jr., Cambridge, Mass., assignor to Codex Corporation, Mansfield, Mass.

Filed Jun. 12, 1987, Ser. No. 62,497
Int. Cl.[4] H04L 27/04
U.S. Cl. 375—42 18 Claims



1. Apparatus for communicating data over a channel comprising

an encoder for selecting a series of signal points from a constellation of available points, said constellation comprising points of a lattice Λ (or a coset of Λ) that lie within a Voronoi region of a sublattice Λ′ of Λ, where Λ′ is other than a scaled version of Λ, and

a modulator for modulating a carrier on said channel in accordance with said selected series of signal points.

4,894,845

RECEIVER FOR A PHASE-SHIFT KEYED CARRIER SIGNAL

Gerardus J. M. Janssen, Zoetermeer, and Antonius P. Verlijsdonk, Nuenen, both of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 1, 1988, Ser. No. 201,512
Claims priority, application Netherlands, Jun. 2, 1987, 8701290
Int. Cl.[4] H03D 3/22
U.S. Cl. 375—83 2 Claims

1. A receiver for a passband signal generated by a phase-shift keying of a carrier in accordance with a data signal of a predetermined symbol rate 1/T, the receiver comprising:

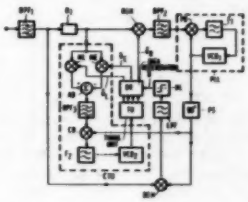
demodulation means for demodulating said received passband signal and thereby producing a demodulated data signal;

regeneration means coupled to said demodulation means for regenerating said demodulated data signal with the aid of a local clock as provided by a local clock generator and thereby producing a regenerated data signal; and

carrier recovery means coupled to said demodulation means, which comprises a phase-locked loop having a local carrier generator for providing a local carrier, and a first remodulator for phase-shift keying of said received passband signal in accordance with said regenerated data signal and thereby producing a carrier component as an input signal for said phase-locked loop;

a local clock generator connected to the regeneration characterized in that,

said regeneration means produces a delayed and advanced versions of the regenerated data signal with a delay and an advance, respectively, relative to the regenerated data signal, over a time interval Δ less than symbol interval T, and



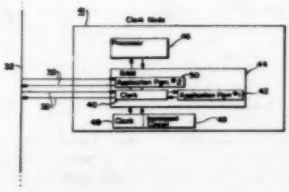
said receiver also includes means responsive to said received passband signal and said local carrier for generating a baseband control signal for said local clock generator, said baseband control signal being representative of the difference between the correlation function of the data signal inherent to said received passband signal with said delayed version of the regenerated data signal and the correlation function of the data signal inherent to said received passband signal with said advanced version of the regenerated data signal, said local clock generator, in response to said baseband control signal, providing said local clock to said regeneration means so that said regenerated data signal is in synchronism with said data signal which is inherent to said received passband signal applied to said first remodulator.

4,894,846

METHOD FOR MAINTAINING A CORRECT TIME IN A DISTRIBUTED PROCESSING SYSTEM

Michael Fine, Cambridge, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.

Filed Jun. 30, 1988, Ser. No. 213,746
Int. Cl.[4] H04L 7/04
U.S. Cl. 375—107 43 Claims



41. A time provider node in a distributed processing system containing a plurality of interconnected server nodes, the time provider node maintaining a correct time and comprising:

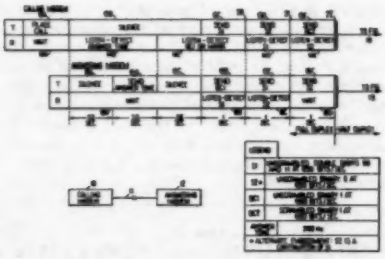
a memory;
a local clock keeping a local time having an associated inaccuracy;
increment circuit means connected to said local clock for causing said local time to increase periodically;
external time source interface means for receiving an external time value from an external time source;
means, connected to the external time source interface means and executing instructions stored in the memory, for ascertaining an inaccuracy of the external time source;
means, connected to the ascertaining means and executing instructions stored in the memory, for calculating a correct time, including the external time value and an interval reflecting the inaccuracy of the external time source, from said external time value and said inaccuracy of said external time source; and
means connected to said calculating means and executing instructions stored in the memory for adjusting the local time kept by said local clock according to said calculated correct time.

4,894,847

HIGH SPEED HALF DUPLEX MODEM WITH FAST TURNAROUND PROTOCOL

Tarana Tjahjadi, Duluth; German E. Correa, Alpharetta; Matthew F. Easley, Lilburn; John N. Martin, Atlanta; Charles H. McCorvey, Jr., Dunwoody; Randy D. Nash, Dacula; Cynthia A. Panella, Alpharetta; Michael L. Rubinstein; Martin H. Sauser, Jr., both of Atlanta; David F. Strawn, and George R. Thomas, both of Marietta, all of Ga., assignors to Hayes Microcomputer Products, Inc., Norcross, Ga.

Filed May 26, 1987, Ser. No. 54,419
Int. Cl.[4] H04L *23/00*
U.S. Cl. 375—121 **54 Claims**



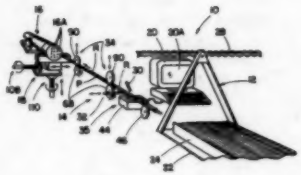
1. A V.22 bis compatible handshake method for an originating modem for establishing communications with an answering modem at a selected speed of 1200 bits per seconds (bps), 2400 bps, or greater than 2400 bps, comprising:
(a) said originating modem sending a first sequence for a first predetermined period;
(b) said originating modem sending a second sequence for a second predetermined period while listening for said first sequence from said answering modem;
(c)
(1) if said first sequence from said answering modem was not heard by said originating modem, said originating modem commencing communications with said answering modem at 1200 bps;
(2) if said first sequence from said answering modem was heard by said originating modem, said originating modem sending a third sequence for a third predetermined period while listening for said second sequence from said answering modem;
(d)
(1) if said second sequence from said answering modem was not heard by said originating modem, said originating modem continuing to send said third sequence for an additional period of time and then commencing training and communications with said answering modem at 2400 bps; and
(2) if said second sequence from said answering modem was heard by said originating modem, said originating modem commencing training and communications with said answering modem at a speed greater than 2400 bps.

4,894,848

AUTOMATED NUCLEAR FUEL ROD PATTERN LOADING SYSTEM

David V. Lambert, St. Matthews; Theodore W. Nylund, Columbia; John W. Byers, West Columbia; Damon E. Haley, Jr., Sumter, and Joseph V. Cioffi, Cola, all of S.C., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 21, 1988, Ser. No. 247,181
Int. Cl.[4] G21C *21/00*
U.S. Cl. 376—261 **22 Claims**



17. Apparatus for loading fuel rods in a desired pattern, comprising:
(a) a carrousel having a plurality of movable gondolas for stocking thereon fuel rods of known enrichments;
(b) an elongated magazine defining a matrix of elongated slots being open at their forward ends for receiving fuel rods;
(c) a workstation defining a fuel rod feed path and including
(i) means for receiving successively one at a time along said feed path fuel rods from selected ones of said gondolas of said carrousel and verifying the identity of the fuel rods,
(ii) means for feeding successively one at a time along said feed path the verified fuel rods into selected ones of the slots in said magazine, and
(iii) means disposed along the feed path between said fuel rod identity verifying means and said fuel rod feeding means for movement between blocking and unblocking positions relative to the feed path to respectively prevent passage of a fuel rod to said feeding means until the identify of the fuel rod is verified as correct and to allow such passage of the fuel rod after such verification is made; and
(d) an holder and indexing mechanism for movably supporting said magazine and being actuatable for moving the magazine along X-Y axes to successively align one at a time selected ones of said slots with said feed path for loading in said magazine the successive fuel rods in a desired enrichment pattern.

4,894,849

APPARATUS AND METHOD FOR TRANSFERRING NUCLEAR REACTOR FUEL ASSEMBLIES

Thomas L. Robosky, West Mifflin; Kenneth J. Swidwa, N. Versailles, and James R. Marshall, Penn Hills, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 30, 1988, Ser. No. 252,218
Int. Cl.[4] G21C *19/10*
U.S. Cl. 376—268 **18 Claims**

9. Apparatus for transferring fuel assemblies to and from a

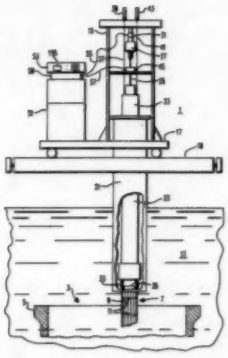
nuclear reactor core immersed in a pool of water, said apparatus comprising:

a gripper mast;

cable means for raising and lowering said gripper mast;

gripper means carried by the mast for engaging fuel assemblies;

load sensing means for measuring the loads suspended by the cable means including the weight of the gripper mast, the gripper means and any fuel assembly engaged by the gripper means;



height measuring means for measuring the height of the gripper means carried by the gripper mast for said reactor core;

control means comparing the load sensed by the load sensing means with selected load limits and to inhibit operation of said cable means when said measured load is outside said limits, and means for adjusting said load limits for changes in the buoyancy of said gripper mast as a function of said height measured by the height measuring means.

4,894,850

X-RAY APPARATUS FOR SLIT RADIOGRAPHY

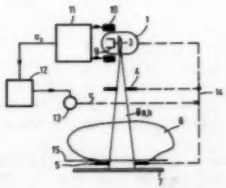
Gottfried Frings, Stolberg; Walter Hillen, and Ulrich Schiebel, both of Aachen, all of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 25, 1988, Ser. No. 236,585

Claims priority, application Fed. Rep. of Germany, Aug. 29, 1987, 3728878

Int. Cl.[4] G21K *5/10*

U.S. Cl. 378—62 **5 Claims**



1. An X-ray apparatus comprising:

an x-ray tube which includes a rotating anode;

diaphragm means for forming an X-ray radiation beam from X-rays produced at a focal spot on the anode;

X-ray recording means disposed in the beam;

means which effect a relative movement of the recording means with respect to the beam during an X-ray exposure of the recording means; and

synchronizing means which adjust the rate of rotation of the anode and/or the relative speed of said beam with respect to the recording means as a function of an intensity profile of the beam at the recording means to compensate the exposure of the recording means for fluctuations in the intensity of the beam which are caused by periodic movement of the focal spot.

4,894,851

METHOD OF AND DEVICE FOR MEASURING IMAGE LAG IN X-RAY SYSTEM

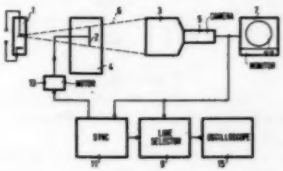
Johannes N. Kroon, and Franciscus Schmal, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 13, 1989, Ser. No. 337,500

Claims priority, application Netherlands, Apr. 27, 1988, 8801094

Int. Cl.[4] G01D *18/00*

U.S. Cl. 378—99 **8 Claims**



1. A method of measuring image lag in an X-ray system comprising an X-ray source, an image intensifier and a video camera, in which a disc having a pattern of comparatively strongly and comparatively weakly X-ray-absorbing areas is placed between the X-ray source and the image intensifier with its axis substantially parallel to the axis of an X-ray beam emitted by the X-ray source, which disc is made to rotate about its axis, and in which the image lag of the X-ray system is determined from the output signal of the video camera, characterized in that the pattern of the disc comprises at least a coiled comparatively strongly X-ray-absorbing area which is coaxial with the disc, that at least one video line, that is situated in a part of the image on which the centre of the disc is displayed, is selected from the video signal produced by the video camera that the signal amplitude of the selected video line is determined, and that the image lag is measured from the ratio of the signal amplitude measured while the disc is stationary and the signal amplitude measured while the disc is rotating at a given speed.

4,894,852

X-RAY SOURCE WITH DUAL MONOCRYSTAL TARGETS

Kamalaksha Das Gupta, 2918-69th St., Lubbock, Tex. 79413

Filed Apr. 30, 1987, Ser. No. 44,232

Int. Cl.[4] H01S *3/16*

U.S. Cl. 378—119 **17 Claims**

1. In an X-ray source with dual monocrystal targets, the combination comprising:

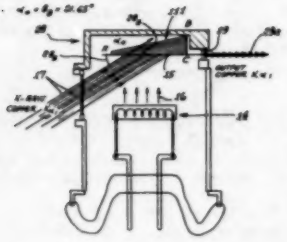
(a) a first monocrystal having parallel lattice planes, and an optically flat, slant cut, planar face extending at an angle θ_B relative to said lattice planes where θ_B is the Bragg angle,

(b) first means located to excite the first monocrystal at said face, and along a line at the intersection with said face of another plane normal to said face and normal to said lattice planes,

(c) and other means producing beams of Kossel $K\alpha_1$ photons

impinging on said line at said face, said beams directed at angles $2\theta_B$ relative to said line,

(d) whereby intense X-ray emission occurs, in a direction which is an extension of said line,



(e) said other means comprising a second monocrystal having a face at an angle θ_B relative to said line, and electron gun means directing second beams of electrons at said face of the second monocrystal.

4,894,853

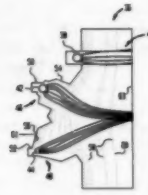
CATHODE CUP IMPROVEMENT

James J. Dowd, Niles, Ill., assignor to Siemens Medical Systems, Inc., Iselin, N.J.

Division of Ser. No. 27,787, Mar. 19, 1987, Pat. No. 4,868,842. This application Jun. 21, 1989, Ser. No. 369,415

Int. Cl.[4] H01J *35/06*

U.S. Cl. 378—138 **10 Claims**



1. An improved x-ray tube cathode cup focusing slot having means for applying a side wall potential for providing a focal spot on an anode having high emission, said focusing slot having electron beam focusing sidewalls of electrically conductive material at a potential substantially equal to the cathode potential in the x-ray tube, wherein said focusing sidewalls comprise:

a slot having a generally vee-shaped cross-section comprising first, second and third slot sections formed adjacent one another in the named order within successively deeper portions of a cathode cup;

said first slot section beginning at the surface of said cathode cup and said third slot section forming an apex for said focusing slot;

said first and third slot sections having parallel sidewalls, with the sidewalls of said third slot section being spaced apart by an amount so as to at least partially receive a generally helical elongated filament and yet spaced closer together than the sidewalls of said first slot section; and

the spacing between the sidewalls of said second slot section becoming gradually smaller in a direction deeper into said cathode cup, said sidewalls of said second slot section comprising opposed convex surfaces.

4,894,854

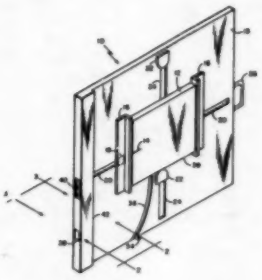
SIZE SENSING X-RAY CASSETTE TRAY

Robert F. Guba, Orange, Conn., and Karl Leschanz, New Rochelle, N.Y., assignors to Varian Associates, Inc., Palo Alto, Calif.

Filed Apr. 28, 1988, Ser. No. 187,206

Int. Cl.[4] G03B *42/02*

U.S. Cl. 378—181 **3 Claims**



1. An apparatus for sensing the length and width dimensions of a substantially rectangular X-ray cassette mounted on an X-ray cassette tray comprising:

front and rear cassette engaging clamp means slidably mounted on said tray for centering and holding an X-ray cassette on said tray;

linking means including a first arm pivotly mounted on said tray for enabling the movement in unison of said front and rear cassette engaging clamp means towards and away from each other;

a first potentiometer possessing a wiper attached to said first arm adapted to move in electrical contact with a flat arcuate resistive track mounted on said tray as said first arm rotates on its pivot, said first potentiometer having nonlinear output characteristics such that equal displacements of said front and rear cassette engaging clamp means result in substantially equal changes in resistance;

a second arm pivotly mounted on said tray having one end adapted for rotating to contact an unclamped side of an X-ray cassette held by said front and rear cassette engaging clamp means on said tray;

a second potentiometer possessing a wiper attached to said second arm adapted to move in electrical contact with a flat arcuate resistive track mounted on said tray as said second arm rotates on its pivot, said second potentiometer having nonlinear output characteristics such that equal increments in the distance between the unclamped sides of a substantially regular X-ray cassette held and centered on said tray result in substantially equal changes in resistance.

4,894,855

X-RAY DIAGNOSTICS SYSTEM HAVING SUSPENDED POSITION ADJUSTABLE COMPONENTS

Heinz Kresse, Uttenreuth, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Continuation of Ser. No. 912,041, Sep. 26, 1986, abandoned. This application Dec. 23, 1988, Ser. No. 289,429

Claims priority, application Fed. Rep. of Germany, Oct. 9, 1985, 3536079

Int. Cl.[4] H05G *1/02*

U.S. Cl. 378—196 **8 Claims**

1. An x-ray diagnostics system comprising:

an x-ray source;

a patient support bed;

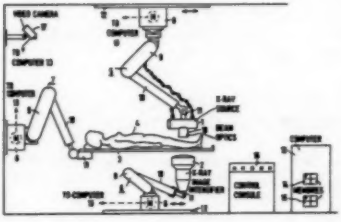
an x-radiation receiver for detecting radiation passing

through an examination subject on said patent support bed;

means for suspending said x-ray source including a base, a first lever having a first end connected to said base so as to be swivelable about a first axis, and a second end, a second lever having a first end connected to said second end of said first lever so as to be swivelable about a second axis, said first and second axes being parallel, and a second end connected to said x-ray source, said base containing a motor for operating said means for suspending said x-ray source;

means for suspending said patient support bed including a base, a first lever having a first end connected to said base so as to be swivelable about a first axis, and a second end, a second lever having a first end connected to said second end of said first lever so as to be swivelable about a second axis, said first and second axes being parallel, and a second end connected to said patient support bed, said base containing a motor for operating said means for suspending said patient support bed;

means for suspending said x-radiation receiver including a



base, a first lever having a first end connected to said base so as to be swivelable about a first axis, and a second end, a second lever having a first end connected to said second end of said first lever so as to be swivelable about a second axis, said first and second axes being parallel, and a second end connected to said x-radiation receiver, said base containing a motor for operating said means for suspending said x-radiation receiver;

said means for suspending said x-ray source, said means for suspending said patient support bed and said means for suspending said x-radiation receiver all being disposed separately from each other; and

a computer connected to said means for suspending said x-ray source, to said means for suspending said patient support bed and to said means for suspending said x-radiation receiver for controlling and coordinating movement of said x-ray source, said x-radiation receiver and said patient support bed, said computer including a programmable memory containing a plurality of different program sequences for simultaneously moving said x-ray source, said patient support bed and said x-radiation receiver along predetermined paths.

4,894,856

CORDLESS TELEPHONE SET OPERATED UNDER MULTI-CHANNEL ACCESS

Akio Nakanishi, Sagamihara; Ken-ichi Ikegaya, and Takao Naitoh, both of Yokohama, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Aug. 18, 1987, Ser. No. 86,503

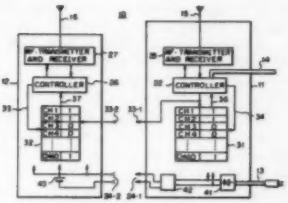
Claims priority, application Japan, Aug. 19, 1986, 61-192152

Int. Cl.[4] H01Q 7/04

U.S. Cl. 379—61 **17 Claims**

1. A cordless telephone set operated under multi-channel access, comprising a base unit and a handset unit between which a radio frequency (RF) link is formed through a channel selected from previously allotted channels, wherein

the base unit and the handset unit are each provided with a channel random access memory (RAM) for storing up-to-date channel information indicating whether each of the channels is busy or idle, which channel information is searched for by said base unit and is continuously renewed



and the same channel information is written to both channel RAM's during a stand-by mode, the RAM's being coupled to the base unit during the standby mode, and utilized for a quick establishment of the RF link.

4,894,857

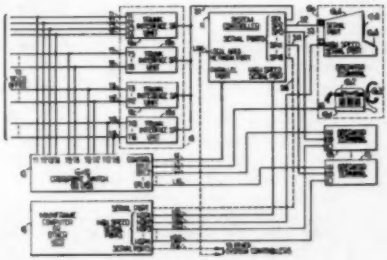
METHOD AND APPARATUS FOR CUSTOMER ACCOUNT SERVICING

Aleksander Szlam, Norcross; James W. Crooks, Jr., Marietta, both of Ga.; Curtis G. Marks, Eden Prairie, Minn., and Charles L. Warner, II, Stone Mountain, Ga., assignors to Inventions Inc., Norcross, Ga.

Continuation-in-part of Ser. No. 62,944, Jun. 16, 1987, Pat. No. 4,797,911. This application Dec. 20, 1988, Ser. No. 287,008

Int. Cl.[4] H04M 1/276, 11/00

U.S. Cl. 379—67 **68 Claims**



39. For use with a customer account servicing system having a host and a plurality of operator terminals, said host containing a plurality of customer account records, each operator terminal of said operator terminals comprising a data terminal and a corresponding audio communications means, said host using a predetermined applications program and communicating with a plurality of said data terminal using a predetermined instruction set and a predetermined data format, an apparatus for upgrading said customer account servicing system to provide for automated call placement and handling while still using said predetermined applications program, said predetermined instruction set and said predetermined data format, comprising:

trunk switching means responsive to switching control signals for connecting selected ones of a plurality of telephone trunks to selected ones of a plurality of said audio communications means;

trunk interface means responsive to interface control signals for performing selected functions on said telephone trunks and providing a status for said telephone trunks; and

control means having a host interface port for communicating with said host using said predetermined instruction set and said predetermined data format, at least one terminal interface port connected to said plurality of said data terminal, a switching control port for providing said switching control signals, and a trunk interface control port for providing said interface control signals, said control means obtaining a predetermined number of said customer account records from said host using said predetermined instruction set and said predetermined data format and, for at least one record, extracting a customer telephone number, causing said trunk interface means to place an outgoing call by dialing said customer telephone number on a selected trunk of said telephone trunks, responding to said trunk interface means providing an indication that said outgoing call has been answered by causing said trunk switching means to connect said selected trunk for said outgoing call which has been answered to a said audio communications means of an available operator, and causing said host to send at least a portion of said record to said data terminal of said available operator.

40. For use with a customer account servicing system having a host and a plurality of operator terminals, said host containing a plurality of customer account records, each operator terminal of said operator terminals comprising a data terminal and a corresponding audio communications means, said host using a predetermined applications program and communicating with a plurality of said data terminal using a predetermined instruction set and a predetermined data format, an apparatus for upgrading said customer account servicing system to provide for automated incoming call handling while still using said predetermined applications program, said predetermined instruction set and said predetermined data format, comprising:

trunk switching means responsive to switching control signals for connecting selected ones of a plurality of telephone trunks to selected ones of said audio communications means;

incoming call detection means for providing a ring detect signal when an incoming call occurs on a said telephone trunk; and

automatic number identification (ANI) decoder means responsive to predetermined signals on said telephone trunk which has said incoming call for providing a calling party telephone number;

control means having a host interface port for communicating with said host using said predetermined instruction set and said predetermined data format, at least one terminal interface port connected to said plurality of said data terminal, and a switching control port for providing said switching control signals, said control means responding to said ring detect signal by causing said trunk switching means to connect said telephone trunk which has said incoming call to said audio communications means for an available operator, and responding to said calling party telephone number by using said predetermined instruction set and said predetermined data format to cause said host to provide to said data terminal for said available operator at least a portion of a customer account record which has a customer telephone number corresponding to said calling party telephone number.

4,894,858

PORTABLE THROUGH-DOOR INTERCOM

Michael R. Collingwood, 10260 Warner Ave. #B, Fountain Valley, Calif. 92708

Filed May 26, 1989, Ser. No. 358,151
Int. Cl.[4] H04M *1/04, 9/04*
U.S. Cl. 379—167 **21 Claims**

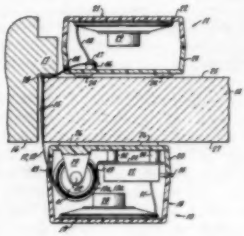
1. A through-door security intercom system, which comprises:

(a) an outside electrical intercom unit,

(b) an inside electrical intercom unit, said units being small in size,

(c) means to mount said outside and inside units near the outside and inside surfaces, respectively, of a door adjacent an edge of said door,

said mounting means including, at least in part, means that extend between said outside and inside units adjacent



said door edge between said edge and the jamb of said door, there being nothing that extends into or through said door, and

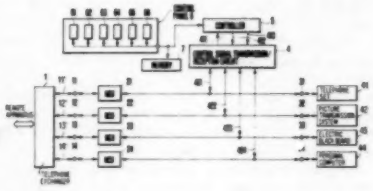
(d) means to electrically connect said outside and inside units to each other.

4,894,859

APPARATUS FOR CONNECTING A PLURALITY OF CHANNELS

Takayoshi Sou; Toshio Oshima, and Kazuhiko Nakamura, all of Tokyo, Japan, assignors to NEC Corporation, Japan

Continuation-in-part of Ser. No. 880,702, Jul. 1, 1986, abandoned. This application Nov. 28, 1988, Ser. No. 277,405
Claims priority, application Japan, Jul. 5, 1985, 60-146469
Int. Cl.[4] H04M *3/56*
U.S. Cl. 379—204 **4 Claims**



1. Apparatus for connecting a plurality of channels comprising:

A plurality of line interface means for interconnecting channels respectively connected to a plurality of remote apparatus and a plurality of terminal devices;

a control signal transmission/reception circuit connected to terminal device side terminals of respective network control units, said control signal transmission/reception circuit detecting an acknowledge signal and a channel close instruction signal which are originated from said remote apparatus received through said line interface means to send out detected information and sending said acknowledge signals in response to a first control signal and said channel close instruction signals in response to second control signal to said channels through said line interface means;

a control panel including means for inputting an information regarding connection of said channels and means designating connection and disconnection of said channels;

memory means for storing said connecting information inputted from said control panel; and

control means for outputting the first and second control signals to said control signal transmission/reception cir-

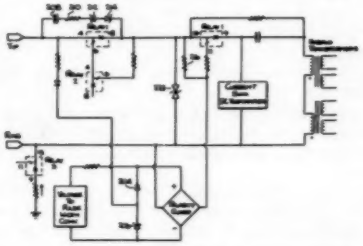
cuit when a calling signal is received from said remote apparatus and when an instruction designating the disconnection of the channel is received from said control panel, respectively, and, responsive to the detected information output of said responsive to the detected information output of said control signal transmission/reception circuit and an output of said control panel for controlling respective line interface means so as to interconnect said channels and the terminal devices when said acknowledge signal is received from said remote apparatus and to close said channels when said channel close instruction signal is received from said remote apparatus.

4,894,860

TRUNK INTERFACE CIRCUITRY FOR TELEPHONE SYSTEMS

Vincent V. Korsky, Shelton; Rajmund Krzyszczyk, New Britain, and Jin T. Lim, Trumbull, all of Conn., assignors to TIE/communications, Inc., Shelton, Conn.

Filed Jun. 7, 1988, Ser. No. 203,722
Int. Cl.[4] H04M *3/22, 7/14*
U.S. Cl. 379—240 **12 Claims**



9. An interface circuit for interfacing a local telephone network to a trunk line of a central office of the telephone company comprising:

(a) means for establishing a loop current path in the trunk line between a telephone of the local network and the central office; and

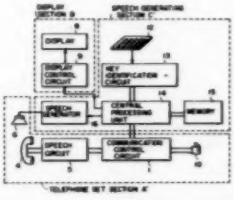
(b) a voltage-to-pulse width converter for measuring the voltage across the trunk line to monitor the condition and status of the trunk line.

4,894,861

TERMINAL IN COMMUNICATION NETWORK FOR NOTIFYING ORIGINATING PARTY'S NUMBER

Masanobu Fujioka, Ohmiya, Japan, assignor to Kokusai Denshin Denwa Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 18, 1988, Ser. No. 273,213
Claims priority, application Japan, Dec. 10, 1987, 62-310839
Int. Cl.[4] H04M *1/57, 3/42*
U.S. Cl. 379—374 **3 Claims**



1. A terminal for use with a communication system for receiving incoming calls of originating parties of the communication system and for notifying individual terminating parties by an audible indication of individual subscribers' incoming calls being received the terminal comprising,

means for connecting the terminal to the communication system for receiving incoming calls therefrom,

memory means for pre-registering a plurality of subscriber's numbers whose incoming calls are anticipated and ID information corresponding to each individual subscribers number,

control means connected to said memory means and receptive of incoming calls for determining whether an incoming call number corresponds with a registered subscriber's number and for generating a command signal output representative of the subscriber's registered number when correspondence of an incoming call number and a subscriber's registered number occurs, and

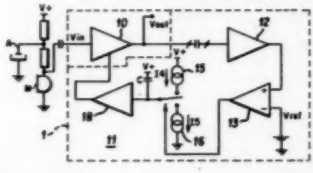
speech generating means for receiving and responding to said control means command signal output for providing an audible indication of the ID information corresponding to the registered subscriber's number corresponding to an incoming call number of an originating party.

4,894,862

SIGNAL COMPRESSION CIRCUIT, PARTICULARLY FOR A TELEPHONE SET

Bruno Defretin, Saint-Egreve, and Thierry Arnaud, Meylan, both of France, assignors to SGS-Thomson Microelectronics S.A., Gentilly, France

Filed Jul. 19, 1988, Ser. No. 222,432
Claims priority, application France, Jul. 21, 1987, 87 10604
Int. Cl.[4] H04M *9/08*
U.S. Cl. 379—390 **9 Claims**



1. A signal compression circuit for a handsfree-type telephone set, comprising:

a preamplifier, having an input for receiving an input signal to be processed; and

a preamplifier gain control device for servo-controlling, to a predetermined value, the amplitude of an output signal supplied by said preamplifier, wherein said gain control device is responsive to a voltage across a capacitor of a circuit including said capacitor and first and second current sources, said circuit for determining two time constants which respectively control rise time and fall time of the preamplifier gain in response to the amplitude of said input signal,

said gain control device including a rectifying circuit for extracting an instantaneous peak value of said output signal of said preamplifier, a comparator circuit for comparing said instantaneous peak value with a reference value corresponding to said predetermined value, and, in response to said comparison, selectively connecting one of said current sources across said capacitor.

4,894,863

METHOD FOR GAIN CONTROL IN TELEPHONE SETS HAVING AN ELECTRONIC SPEECH CIRCUIT, AND APPARATUS FOR PERFORMING THE METHOD

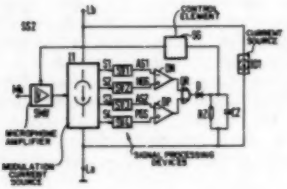
Emil Navratil, and Armin Doll, both of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 30, 1987, Ser. No. 103,385

Claims priority, application Fed. Rep. of Germany, Sep. 30, 1986, 3633232

Int. Cl.[4] H04M *1/60*

U.S. Cl. 379—395 27 Claims



1. In a telephone set having an electronic speech circuit, including a modulation current source, two line terminals connecting the modulation current source to a telephone line, and a microphone amplifier having an input connected to a microphone terminal and an output controlling the modulation current source for generating a line signal, a method for gain control which comprises the steps of:

(a) deriving from the modulation current source measurement signals and threshold value signals;

(b) comparing the measurement signals and threshold value signals with one another;

(c) regulating the gain of the microphone amplifier as a function of the result of the comparison; and

(d) further deriving dynamically the threshold value signals as a function of both the current and voltage of the telephone line as threshold value signals for upper and lower current amplitude limits of the electronic speech circuit.

4,894,864

INTERFACE CIRCUIT

John W. Cook, Ipswich, England, assignor to British Telecommunications public limited company, London, United Kingdom

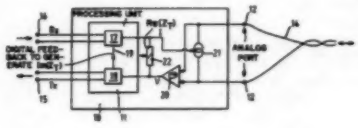
PCT No. PCT/GB86/00707, § 371 Date Jul. 14, 1987, § 102(e) Date Jul. 14, 1987, PCT Pub. No. WO87/03440, PCT Pub. Date Jun. 4, 1987

PCT Filed Nov. 19, 1986, Ser. No. 95,573

Claims priority, application United Kingdom, Nov. 22, 1985, 8528843

Int. Cl.[4] H04B *3/03*

U.S. Cl. 379—398 5 Claims



1. A transmission system comprising:

an analog loop,

means for coding analog signals from said loop to provide a digital output,

means for decoding a digital input to supply analog signals to said loop,

a digital filtering means for supplying a portion of the digital output to the digital input to synthesize the imaginary component of a terminating impedance Z_T for the analog loop

characterized by a variable resistance terminating the analog loop and processing means controlling said digital filtering means, said means for coding and said means for decoding and also including means for simulteaneously changing the resistance of said variable resistance and for changing the transfer function of the digital filtering means such as to change the value of the terminating impedance without substantially changing the frequency response of the transmission system.

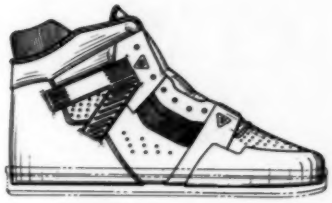
DESIGNS

JANUARY 16, 1990

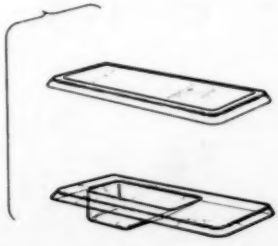
305,475
SKI BOOT
Mariano Sartor, Montebelluna, and Valerio Tonel, Barbisano, both of Italy, assignors to Nordica S.p.A., Montebelluna TV, Italy
Filed Oct. 30, 1987, Ser. No. 116,129
Claims priority, application Italy, May 12, 1987, 59385/87[U]
Term of patent 14 years
U.S. Cl. D2—276

305,476
COMBINED ATHLETIC SHOE UPPER AND SOLE PERIPHERY
Lin Yung-Mao, Taichung, Taiwan, assignor to Autry Industries, Inc., Dallas, Tex.
Filed Feb. 5, 1987, Ser. No. 11,133
Term of patent 14 years
U.S. Cl. D2—314

305,477
SHOE UPPER
Angelo Maccano, Simi Valley, and Ric Claveria, Loma Linda, both of Calif., assignors to L.A. Gear, Inc., Los Angeles, Calif.
Filed Aug. 16, 1988, Ser. No. 232,917
Term of patent 14 years
U.S. Cl. D2—314

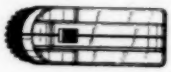


305,478
CONTACT LENS PACKAGE
William Lahm, Jacksonville, Fla., and Robert Cerwin, Pittstown, N.J., assignors to Vistakon, Inc., Jacksonville, Fla.
Filed Jun. 20, 1986, Ser. No. 878,724
Term of patent 14 years
U.S. Cl. D3—34



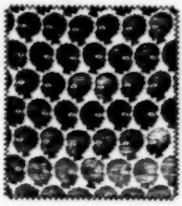
305,479
CYLINDRICAL JEWELRY CASE
Cal R. Williams, 132 NE. Ainsworth, Portland, Oreg. 97211
Filed Sep. 2, 1986, Ser. No. 903,066
Term of patent 14 years
U.S. Cl. D3—75

305,480
POWER DRIVEN SHOE BRUSH
John S. Yuen, Kowloon, Hong Kong, assignor to John Manufacturing Limited, Kowloon, Hong Kong
Filed Jul. 17, 1987, Ser. No. 74,913
Claims priority, application United Kingdom, Jan. 23, 1987, 1039464
Term of patent 14 years
U.S. Cl. D4—102

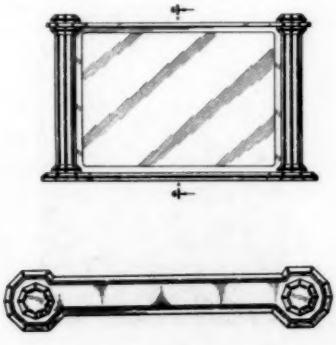


305,481
BATH BRUSH
Robert H. Bruno, Avon, and Keith A. Morrison, Suffield, both of Conn., assignors to Kellogg Brush Manufacturing Co., Easthampton, Mass.
Filed Apr. 23, 1987, Ser. No. 41,362
Term of patent 14 years
U.S. Cl. D4—132

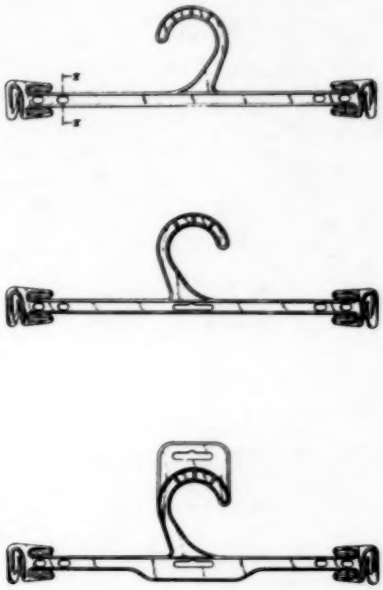
305,482
TEXTILE FABRIC
Giancarlo Utili, Via Faentina Nord 27, 48026 Russi (Ravenna), Italy
Filed Nov. 6, 1985, Ser. No. 803,999
Claims priority, application Italy, May 6, 1985, 21731/85[U]
Term of patent 14 years
U.S. Cl. D5—27



305,483
PHOTO FRAME
Junior C. S. Hsu, 4th Floor, No. 16, Min Tsu East Road, Taipei, Taiwan
Filed Nov. 5, 1986, Ser. No. 927,416
Term of patent 14 years
U.S. Cl. D6—310

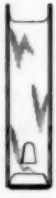


305,484
CLOTHES HANGER
Gerhard Fildan, Dr. Körner Str. 64, A-2521 Trumau, Austria
Filed Apr. 30, 1987, Ser. No. 44,974
Claims priority, application Fed. Rep. of Germany, Nov. 4, 1986, MR-561
Term of patent 14 years
U.S. Cl. D6—326

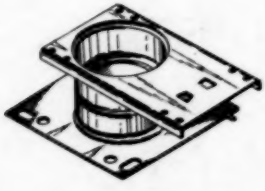


305,485
CHILD'S BOOKCASE AND TOY CHEST UNIT
Jon Zalesak, 813 S. Nash St., Hortonville, Wis. 54944
Filed Oct. 23, 1986, Ser. No. 922,548
Term of patent 14 years
U.S. Cl. D6—438

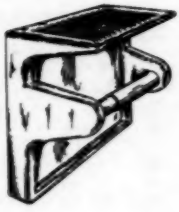
305,486
MAGAZINE AND FILE FOLDER ORGANIZER
Donald B. Rabig, Elizabeth, N.J., assignor to Sterling Plastics Co., Mountainside, N.J.
Filed Apr. 13, 1987, Ser. No. 37,446
Term of patent 14 years
U.S. Cl. D6—475



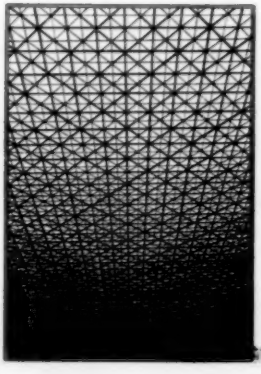
305,487
SEAT MOUNT
Frank L. Kinda, 12112 E. Centralia St., Hawaiian Gardens, Calif. 90716
Filed Jan. 27, 1987, Ser. No. 7,391
Term of patent 14 years
U.S. Cl. D6—496



305,488
COMBINED TOILET PAPER HOLDER AND SHELF
E. Pekka Korpijaako, 85 Washington St., Rocky Hill, N.J. 08553
Filed Nov. 19, 1986, Ser. No. 932,489
Term of patent 14 years
U.S. Cl. D6—523



305,489
COVER
Terrance W. Sachetti, 5930 W. Broadway, Crystal, Minn. 55428
Filed Sep. 26, 1986, Ser. No. 911,820
Term of patent 14 years
U.S. Cl. D6—603



305,490

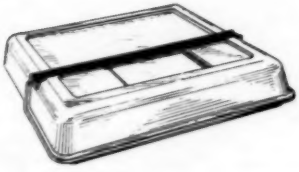
INSULATED FOOD DELIVERY CARRIER

James R. Conley; Neill E. Bryan, and Dan J. Jonker, all of Wichita, Kans., assignors to Coleman Outdoor Products, Inc., Wichita, Kans.

Filed Apr. 3, 1987, Ser. No. 33,637

Term of patent 14 years

U.S. Cl. D7—77



305,491

LADLE

Mark W. Levie, New York, N.Y., assignor to LK Manufacturing Corporation, West Babylon, N.Y.

Filed Oct. 3, 1986, Ser. No. 915,337

Term of patent 14 years

U.S. Cl. D7—104

305,492

MICROWAVE OVEN

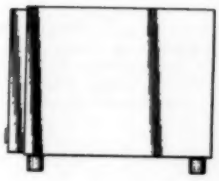
Masayoshi Kawaishi, and Koji Satake, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan

Filed Aug. 19, 1986, Ser. No. 898,008

Claims priority, application Japan, Feb. 19, 1986, 61-5901

Term of patent 14 years

U.S. Cl. D7—351



305,493

PRESSURE COOKER COVER OR THE LIKE

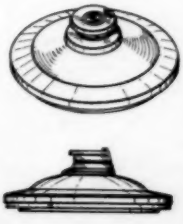
Theophil Ryser, Beckenried, Switzerland, assignor to AMC International Alfa Metalcraft Corporation, Switzerland

Filed Apr. 25, 1986, Ser. No. 857,464

Claims priority, application World Int. Prop. O., Oct. 30, 1985, DMA/000436

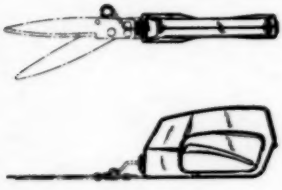
Term of patent 14 years

U.S. Cl. D7—391

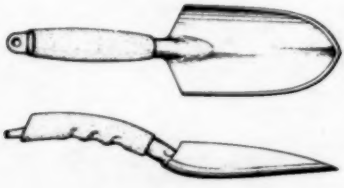


305,494
POLE-MOUNTED PRUNER HOOK
Stephen Jasperson, Riverside, Calif., assignor to Corona Clipper Company, Corona, Calif.
Filed Oct. 31, 1988, Ser. No. 264,512
Term of patent 14 years
U.S. Cl. D8—7

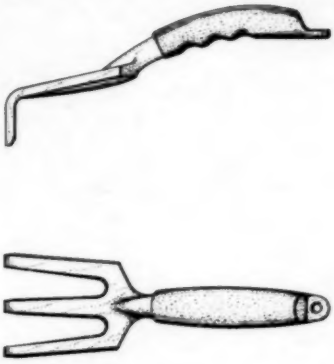
305,495
HANDLE FOR GRASS SHEARS
Larry D. Carter, 358 Burma Rd., Mosinee, Wis. 54455, assignor to Fiskars Oy Ab, Helsinki, Finland
Filed Mar. 23, 1988, Ser. No. 172,132
Term of patent 14 years
U.S. Cl. D8—8



305,496
GARDEN TROWEL
Stephen Jasperson, Riverside, Calif., assignor to Corona Clipper Company, Corona, Calif.
Filed Jul. 25, 1988, Ser. No. 223,539
Term of patent 14 years
U.S. Cl. D8—10



305,497
GARDEN CULTIVATOR
Stephen Jasperson, Riverside, Calif., assignor to Corona Clipper Company, Corona, Calif.
Filed Jul. 25, 1988, Ser. No. 223,765
Term of patent 14 years
U.S. Cl. D8—13



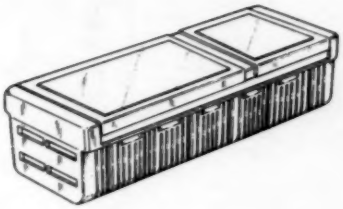
305,498
ROUTER BIT
Will M. Lassiter, P.O. Box 1624, High Point, N.C. 27261
Filed Oct. 5, 1988, Ser. No. 253,741
Term of patent 14 years
U.S. Cl. D8—70

305,499
CARTON CUTTER
Henry Walker, 7500 Manford Ct., Charlotte, N.C. 28210
Filed May 7, 1987, Ser. No. 47,704
Term of patent 14 years
U.S. Cl. D8—98

305,500
FURNITURE CASTER
Hans G. Lättgen, Montabaur, Fed. Rep. of Germany, assignor to Albert Schulte Söhne GmbH & Co., Wermelskirchen, Fed. Rep. of Germany
Filed Jul. 23, 1986, Ser. No. 888,890
Claims priority, application Fed. Rep. of Germany, Jan. 28, 1986, MR273
Term of patent 14 years
U.S. Cl. D8—375

305,501
ADHESIVE DISPENSER HEAD
Volker Hundertmark, Bad Muender, and Albert Stoeffler, Duesseldorf, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany
Filed Apr. 14, 1986, Ser. No. 852,516
Claims priority, application Int'l Pat. Institute, Nov. 18, 1985, DM/006 099
Term of patent 14 years
U.S. Cl. D9—448

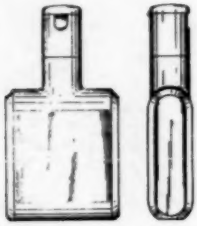
305,502
STORAGE CONTAINER FOR A PICKUP OR THE LIKE
John E. Waters, Waco, Tex., assignor to Durakon Industries, Inc., Lapeer, Mich.
Filed Feb. 10, 1986, Ser. No. 827,859
Term of patent 14 years
U.S. Cl. D9—341



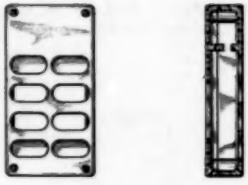
305,503
JAR
Pier L. Bormioli, Mariano, Italy, assignor to Vetreria Padana Polesana S.p.A., Bergantino, Italy
Continuation-in-part of Ser. No. 554,990, Nov. 25, 1983. This application Jan. 29, 1986, Ser. No. 823,601
Term of patent 14 years
U.S. Cl. D9—352

305,504
FUEL CAN
Earl L. Fischer, Rogers, Ark., and John R. Elmburg, Miami, Okla., assignors to U.S. Metal Container Co., Miami, Okla.
Filed Jan. 12, 1987, Ser. No. 2,271
Term of patent 14 years
U.S. Cl. D9—374

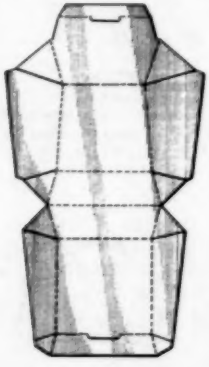
305,505
BOTTLE AND CAP
Edward J. Kunesh, Kenosha, Wis., assignor to S. C. Johnson & Son, Inc., Racine, Wis.
Filed Jun. 30, 1987, Ser. No. 67,855
Term of patent 14 years
U.S. Cl. D9—413



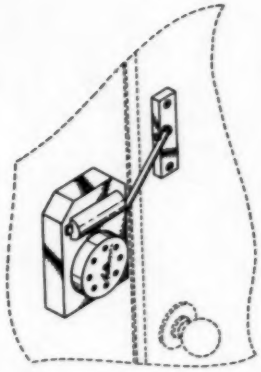
305,506
PLASMA CONTAINER OR THE LIKE
Otto Sittig, 4143 Rosewood Ave., Los Angeles, Calif. 90004
Filed Mar. 23, 1987, Ser. No. 29,487
Term of patent 14 years
U.S. Cl. D9—418



305,507
CARTON BLANK
Hampton E. Forbes, Jr., Newark, Del., assignor to Westvaco Corporation, New York, N.Y.
Filed Oct. 9, 1987, Ser. No. 106,326
Term of patent 14 years
U.S. Cl. D9—433



305,508
AUDIBLE WINDOW AND DOOR INTRUSION ALARM
Daniel L. Lothamer, 8720 Stellhorn Rd., Fort Wayne, Ind. 46815
Filed Jul. 15, 1986, Ser. No. 885,729
Term of patent 14 years
U.S. Cl. D10—106

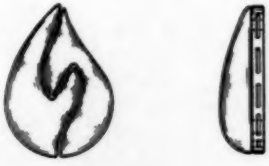


305,509
NECKLACE
Paolo Bulgari, Rome, Italy, assignor to Partecipazioni Bulgari S.p.A., Rome, Italy
Filed Apr. 30, 1987, Ser. No. 44,116
Claims priority, application Italy, Oct. 31, 1986, 36209/86[U]
Term of patent 14 years
U.S. Cl. D11—17

305,510
NECKLACE
Paolo Bulgari, Rome, Italy, assignor to Partecipazioni Bulgari S.p.A., Rome, Italy
Filed Apr. 30, 1987, Ser. No. 44,192
Claims priority, application Italy, Oct. 31, 1986, 36208/86[U]
Term of patent 14 years
U.S. Cl. D11—17

305,511
RING
Paolo Bulgari, Rome, Italy, assignor to Partecipazioni Bulgari S.p.A., Rome, Italy
Filed Dec. 14, 1987, Ser. No. 132,108
Claims priority, application Italy, Jun. 22, 1987, 35871/87[U]
Term of patent 14 years
U.S. Cl. D11—27

305,512
LINK ELEMENT
Paolo Bulgari, Rome, Italy, assignor to Partecipazioni Bulgari S.p.A., Rome, Italy
Filed Apr. 30, 1987, Ser. No. 44,191
Claims priority, application Italy, Oct. 31, 1986, 36202[U]
Term of patent 14 years
U.S. Cl. D11—86



305,513
LINK ELEMENT
Paolo Bulgari, Rome, Italy, assignor to Partecipazioni Bulgari S.p.A., Rome, Italy
Filed Apr. 30, 1987, Ser. No. 44,110
Claims priority, application Italy, Oct. 31, 1986, 36206[U]
Term of patent 14 years
U.S. Cl. D11—93

305,514
LINK ELEMENT
Paolo Bulgari, Rome, Italy, assignor to Partecipazioni Bulgari S.p.A., Rome, Italy
Filed Apr. 30, 1987, Ser. No. 44,112
Claims priority, application Italy, Oct. 31, 1986, 36203-B/86
Term of patent 14 years
U.S. Cl. D11—93

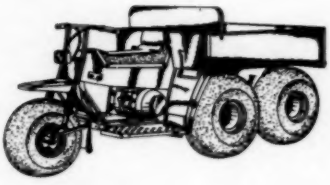
305,515
LINK ELEMENT
Paolo Bulgari, Rome, Italy, assignor to Partecipazioni Bulgari S.p.A., Rome, Italy
Filed Apr. 30, 1987, Ser. No. 44,126
Claims priority, application Italy, Oct. 31, 1986, 36217-B/86
Term of patent 14 years
U.S. Cl. D11—93

305,516
LINK ELEMENT
Paolo Bulgari, Rome, Italy, assignor to Partecipazioni Bulgari S.p.A., Rome, Italy
Filed Apr. 30, 1987, Ser. No. 44,127
Claims priority, application Italy, Oct. 31, 1986, 36200 B/86
Term of patent 14 years
U.S. Cl. D11—93

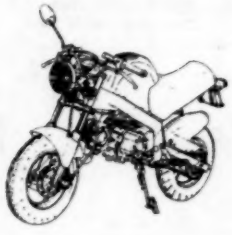
305,517
LINK ELEMENT
Paolo Bulgari, Rome, Italy, assignor to Partecipazioni Bulgari S.p.A., Rome, Italy
Filed Apr. 30, 1987, Ser. No. 44,129
Claims priority, application Italy, Oct. 31, 1986, 36201-B/86
Term of patent 14 years
U.S. Cl. D11—93

305,518
LINK ELEMENT
Paolo Bulgari, Rome, Italy, assignor to Partecipazioni Bulgari S.p.A., Rome, Italy
Filed Apr. 30, 1987, Ser. No. 44,130
Claims priority, application Italy, Oct. 31, 1986, 36205-86[U]
Term of patent 14 years
U.S. Cl. D11—93

305,519
UTILITY HAULING VEHICLE
William E. Crookes, Waldwick, N.J.; David D. Dreaner, Cedar Falls, Iowa; Owen C. Kolstad, Waterloo, Iowa; John F. Peacock, Dike, Iowa, and James H. Polacek, Waterloo, Iowa, assignors to Deere & Company, Moline, Ill.
Filed Sep. 4, 1987, Ser. No. 93,411
Term of patent 14 years
U.S. Cl. D12—5

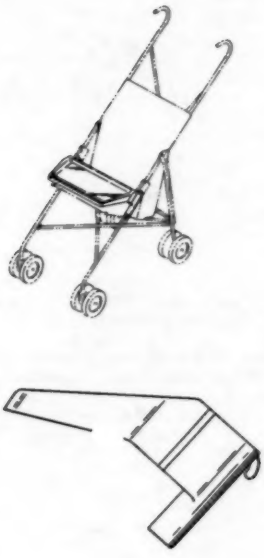


305,520
MOTORCYCLE
Junji Kikuchi; Nobuyuki Shiwa, and Yuji Watanuki, all of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed May 29, 1987, Ser. No. 56,522
Claims priority, application Japan, Dec. 1, 1986, 61-47511
Term of patent 14 years
U.S. Cl. D12—110

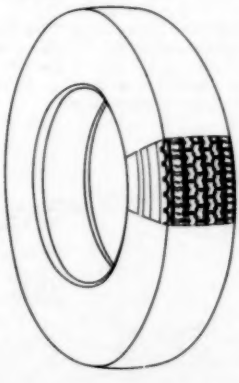


305,521
WHEELCHAIR FOOTBOARD
Thomas R. Wistrak, Brunswick, and Roger H. Ramsey, Copley, both of Ohio, assignors to Invacare Corporation, Elyria, Ohio
Filed Jan. 8, 1987, Ser. No. 1,553
Term of patent 14 years
U.S. Cl. D12—133

305,522
STOWABLE TRAY FOR A COLLAPSIBLE STROLLER
Louis M. Kohus; John V. Mariol, both of Cincinnati, Ohio, and David Saint, Elverson, Pa., assignors to Graco Metal Products Inc., Elverson, Pa.
Filed Apr. 14, 1987, Ser. No. 38,802
Term of patent 14 years
U.S. Cl. D12—133



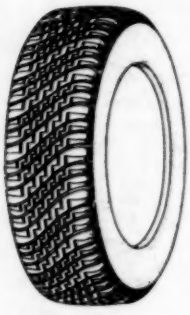
305,523
TIRE
Edward M. Remick, Taylors, S.C., assignor to Michelin Recherche et Technique, Switzerland
Filed Apr. 1, 1987, Ser. No. 30,930
Term of patent 14 years
U.S. Cl. D12—146



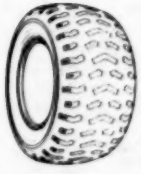
305,524
AUTOMOBILE TIRE
Mitsushige Idei, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan
Filed Feb. 26, 1987, Ser. No. 19,077
Claims priority, application Japan, Oct. 21, 1986, 61-41504
The portion of the term of this patent subsequent to Jan. 16, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D12—147

305,525
AUTOMOBILE TIRE
Mitsushige Idei, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan
Filed Mar. 17, 1987, Ser. No. 26,647
Claims priority, application Japan, Oct. 21, 1986, 61-41505
The portion of the term of this patent subsequent to Jan. 16, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D12—147

305,526
TIRE
Maurice Grass, Luxembourg, Luxembourg, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed Jan. 28, 1987, Ser. No. 8,457
Claims priority, application Benelux, Sep. 3, 1986, 30536-00
Term of patent 14 years
U.S. Cl. D12—149

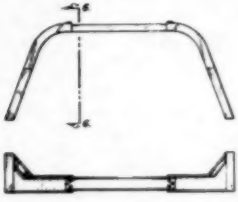


305,527
AUTOMOBILE TIRE
Yasuo Igarashi, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan
Filed Mar. 17, 1987, Ser. No. 26,564
Claims priority, application Japan, Dec. 9, 1986, 61-48715
The portion of the term of this patent subsequent to Jan. 16, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D12—149

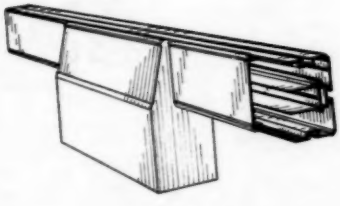


305,528
AUTOMOBILE TIRE
Yasuo Igarashi, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan
Filed Mar. 17, 1987, Ser. No. 26,648
Claims priority, application Japan, Dec. 9, 1986, 61-48716
The portion of the term of this patent subsequent to Jan. 16, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D12—149

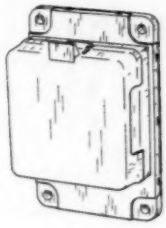
305,529
ACCESSORY FOR OPEN BED TRUCKS FOR SUPPORTING LIGHTS THEREON ABOVE THE CAB OF THE TRUCK
Gary A. Milby, 2372 Meadowfalls, Diamond Bar, Calif. 91765, and Donald J. Kronmeyer, 6224 Plymouth Ct., Yorba Linda, Calif. 92686
Filed Apr. 3, 1987, Ser. No. 33,638
Term of patent 14 years
U.S. Cl. D12—156



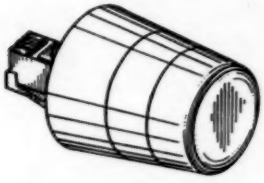
305,530
COMBINED ELECTRICAL WIRING RACEWAY AND OUTLET HOUSING
Hans Strand, Upsala, and Peter Lawton, Täby, both of Sweden, assignors to Thorsman & Co. AB, Nykoping, Sweden
Filed May 23, 1986, Ser. No. 867,273
Claims priority, application Sweden, Dec. 11, 1985, 85-3029
Term of patent 14 years
U.S. Cl. D13—13



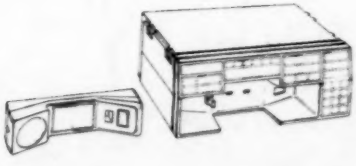
305,531
ELECTRICAL JUNCTION BOX FOR AUTOMOBILE WIRING SYSTEM
Hiroshi Suzuki, and Etsuji Matsumoto, both of Kosai, Japan, assignors to Yazaki Corporation, Tokyo, Japan
Filed Feb. 2, 1987, Ser. No. 10,114
Claims priority, application Japan, Aug. 7, 1986, 61-030685
Term of patent 14 years
U.S. Cl. D13—24



305,532
ROTATABLE MODULAR CONNECTOR FOR A TELEPHONE
Bruce Gallo, Chester, and Charles Hannon, Clinton, both of N.J., assignors to Telcor, Inc., Chester, N.J.
Filed Jan. 7, 1986, Ser. No. 816,803
Term of patent 14 years
U.S. Cl. D14—256

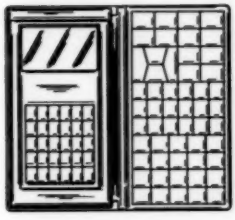


305,533
COMBINATION TELEPHONE STAND AND HANDSET
George Perkins, Eugene, Oreg., and Thomas P. Eisenstadt, Solana Beach, Calif., assignors to TeleQuest, Inc., San Diego, Calif.
Filed Dec. 10, 1986, Ser. No. 940,635
Term of patent 14 years
U.S. Cl. D14—151

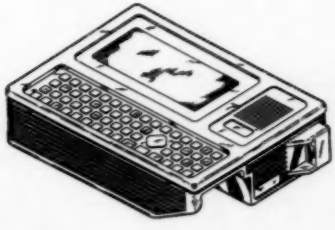


305,534
MOBILE INPUT/OUTPUT DATA TERMINAL
Howard F. Weber, Springhill, Fla., and Donald E. Metivier, Denton, Tex., assignors to ElectroCom Automation, Inc., Houston, Tex.
Filed Apr. 13, 1987, Ser. No. 37,575
Term of patent 14 years
U.S. Cl. D14—100

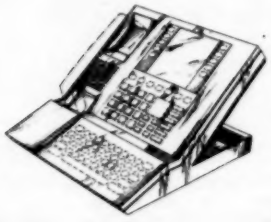
305,535
ELECTRONIC MEMORANDUM INPUT/OUTPUT TERMINAL
Hiroshi Sakaguchi, and Tadahiko Saimen, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed May 26, 1987, Ser. No. 54,366
Claims priority, application Japan, Nov. 26, 1986, 61-47035
Term of patent 14 years
U.S. Cl. D14—100



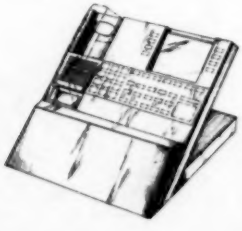
305,536
PORTABLE TERMINAL OR SIMILAR ARTICLE
Scott H. Richards, Sunrise; Raymond W. Burbank; Kevin C. Reid, both of North Lauderdale, and Ronald C. Tate, Sunrise, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.
Filed Jul. 27, 1987, Ser. No. 78,495
Term of patent 14 years
U.S. Cl. D14—100



305,537
COMMUNICATIONS WORKSTATION
Arthur H. Gilmore; Chris G. Johnson, both of New York, N.Y.; Norman W. Petty, Boulder, Colo.; Barbara A. Seelye, Arvada, Colo., and Thomas J. Tierney, Jr., Aurora, Colo., assignors to American Telephone and Telegraph Company, New York, N.Y. and AT&T Information Systems Inc., Morristown, N.J.
Filed Apr. 8, 1987, Ser. No. 35,943
Term of patent 14 years
U.S. Cl. D14—101

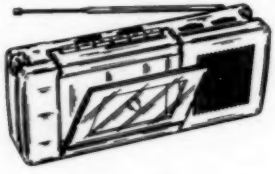


305,538
COMMUNICATIONS WORKSTATION
Arthur H. Gilmore; Chris G. Johnson, both of New York, N.Y.; Norman W. Petty, Boulder, Colo.; Barbara A. Seelye, Arvada, Colo., and Thomas J. Tierney, Jr., Aurora, Colo., assignors to American Telephone and Telegraphy Company, New York, N.Y. and AT&T Information Systems Inc., Morristown, N.J.
Filed Apr. 8, 1987, Ser. No. 35,944
Term of patent 14 years
U.S. Cl. D14—101



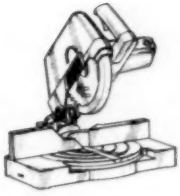
305,539
READER FOR HAND COPYING MACHINE
Hiroshi Sakaguchi, and Tadahiko Saimen, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Apr. 22, 1987, Ser. No. 41,342
Claims priority, application Japan, Oct. 23, 1986, 61-42222
Term of patent 14 years
U.S. Cl. D14—105

305,540
COMBINED TAPE RECORDER AND RADIO
Kazuo Kawabe, and Tsutomu Yamasaki, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Apr. 30, 1987, Ser. No. 44,458
Claims priority, application Japan, Nov. 4, 1986, 61-43551
Term of patent 14 years
U.S. Cl. D14—163

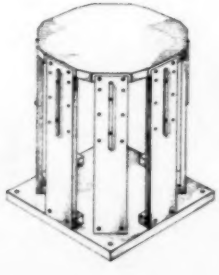


305,541
HEADPHONE
Tomoyuki Hirose, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan
Filed Oct. 16, 1987, Ser. No. 109,850
Claims priority, application Japan, Apr. 22, 1987, 62-15789
Term of patent 14 years
U.S. Cl. D14—205

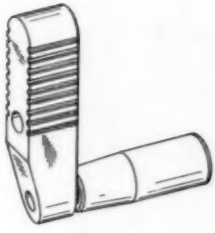
305,542
ELECTRIC MITER SAW
Kouichi Miyamoto; Tomoshige Dehari, both of Hiroshima, and Kiyoshi Hoshino, Tokyo, all of Japan, assignors to Ryobi Ltd., Hiroshima, Japan
Filed Apr. 27, 1987, Ser. No. 43,137
Claims priority, application Japan, Oct. 27, 1986, 61-42748
Term of patent 14 years
U.S. Cl. D15—133



305,543
SUPPORT BASE FOR USE IN AUTOMATED PRODUCTION
A. Roger Guillemette, 37 Fairview Ave., West Warwick, R.I. 02893
Filed Jan. 5, 1987, Ser. No. 2,701
Term of patent 14 years
U.S. Cl. D15—140



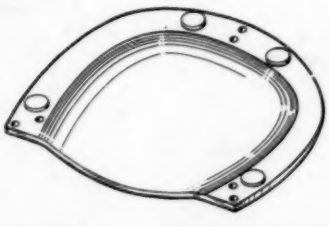
305,544
CRANK HANDLE FOR LATHES OR THE LIKE
Bernhard Ganter, Tribergstrasse 3, Furtwangen, Fed. Rep. of Germany 7743
Filed Jan. 8, 1987, Ser. No. 1,552
Term of patent 14 years
U.S. Cl. D15—142



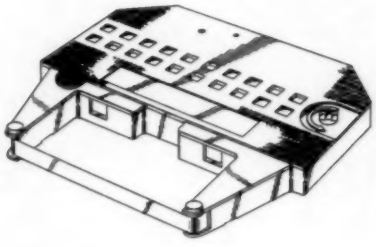
305,545
IMAGING BAFFLE FOR SPLIT IMAGE PRINTS
Randall E. Hopkins, Houston, Tex., assignor to Prestige Images, Inc., Houston, Tex.
Filed Feb. 24, 1986, Ser. No. 836,187
Term of patent 14 years
U.S. Cl. D16—237

305,546
GUITAR
Howard M. Roberts, 8209 182nd Pl., S.W., Edmonds, Wash. 98202
Filed Jul. 17, 1987, Ser. No. 74,508
Term of patent 14 years
U.S. Cl. D17—14

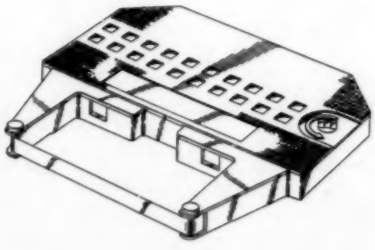
305,547
SHOULDER PAD FOR VIOLIN OR THE LIKE
Steven W. McMillan, 2615 Waugh Dr., #177, Houston, Tex. 77006
Filed Apr. 3, 1986, Ser. No. 847,844
Term of patent 14 years
U.S. Cl. D17—20



305,548
PRINTING RIBBON CARTRIDGE
Mario Bellini, Milan, Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy
Filed Dec. 15, 1987, Ser. No. 133,367
Claims priority, application Italy, Jun. 22, 1987, 53456-B/87
The portion of the term of this patent subsequent to Jan. 16, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D18—12



305,549
PRINTING RIBBON CARTRIDGE
Mario Bellini, Milan, Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy
Filed Dec. 15, 1987, Ser. No. 133,442
Claims priority, application Italy, Jun. 22, 1987, 53452-B/87
The portion of the term of this patent subsequent to Jan. 16, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D18—12

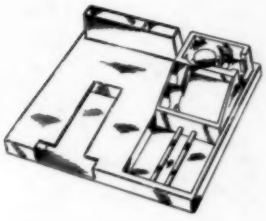


305,550
DATA OUTPUT PRINTER
Takashi Yomo, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Jan. 12, 1988, Ser. No. 143,150
Claims priority, application Japan, Jul. 14, 1987, 62-28830
Term of patent 14 years
U.S. Cl. D18—13

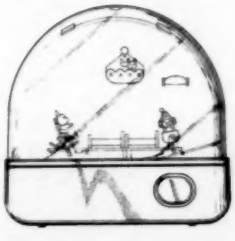
305,551
PEN CAP OR SIMILAR ARTICLE
Shigeo Oka, Tokyo, Japan, assignor to Pentel Kabushiki Kaisha, Tokyo, Japan
Filed Mar. 27, 1987, Ser. No. 32,081
Claims priority, application Japan, Sep. 27, 1986, 61-38304
Term of patent 14 years
U.S. Cl. D19—57

305,552
PEN CAP OR SIMILAR ARTICLE
Kunio Itoh, Funabashi, Japan, assignor to Pentel Kabushiki Kaisha, Tokyo, Japan
Filed Nov. 26, 1986, Ser. No. 935,694
Claims priority, application Japan, May 30, 1986, 61-20816
Term of patent 14 years
U.S. Cl. D19—57

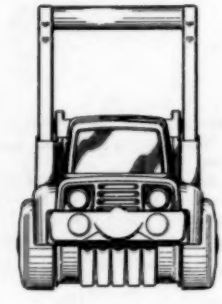
305,553
MULTI-PURPOSE DESK ACCESSORY
David C. Pugliese, 218 S. Pine Apt. 206, Arlington Heights, Ill. 60005, and Edward P. Pugliese, 1832 Sitka La., Mt. Prospect, Ill. 60056
Filed Nov. 24, 1986, Ser. No. 934,476
Term of patent 14 years
U.S. Cl. D19—75



305,554
WATER GAME HOUSING
Makiko Watanabe, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan
Filed Mar. 11, 1987, Ser. No. 24,407
Claims priority, application Japan, Sep. 13, 1986, 61-36245
Term of patent 14 years
U.S. Cl. D21—12



305,555
TOY TRUCK
Lee Spielberger, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Oct. 11, 1988, Ser. No. 256,928
Term of patent 14 years
U.S. Cl. D21—134



305,556
COMBINED TOY TRACKWAY AND TOY ANIMALS THEREFOR
Woon S. Lo, Zhu Hai Shi, China, assignor to Zhu Hai Shi Wan Chai Industrial Company, Kwantung Province, China
Filed Oct. 8, 1986, Ser. No. 916,684
Claims priority, application United Kingdom, Apr. 15, 1986, 1033797
Term of patent 14 years
U.S. Cl. D21—143

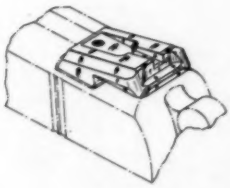
305,557
TOY FIGURE OR THE LIKE
Guy-Claude Joseph, 7955 S. Ashland Ave., Chicago, Ill. 60620
Filed Oct. 31, 1986, Ser. No. 925,410
Term of patent 14 years
U.S. Cl. D21—155

305,558
TOY BIRD
Beverly A. Kessler, 5624 Belmont Ave., Cincinnati, Ohio 45224
Filed Dec. 22, 1986, Ser. No. 944,539
Term of patent 14 years
U.S. Cl. D21—160

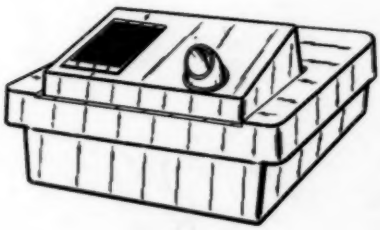
305,559
DOLL BODY OR SIMILAR ARTICLE
Voula Begley, 393A Spotswood Englishtown Rd., Monroe, N.J. 08831
Filed Jul. 25, 1986, Ser. No. 889,411
Term of patent 14 years
U.S. Cl. D21—189

305,560
SKATE BOOT
Thomas B. Hoshizaki, Ville St. Pierre; Kenneth Hall, Pointe Claire, and Rene Bourque, Duvernay, all of Canada, assignors to Canstar Sports Group, Inc., Lachine, Canada
Filed Jun. 22, 1987, Ser. No. 64,452
Term of patent 14 years
U.S. Cl. D21—225

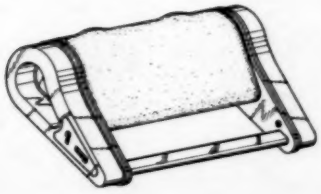
305,561
REAR SIGHT FOR A PISTOL
Wayne F. Novak, 1206-1/2 30th St., P.O. Box 4045, Parkersburg, W. Va. 26102
Filed Jan. 15, 1988, Ser. No. 144,387
The portion of the term of this patent subsequent to Dec. 19, 2006, has been disclaimed.
Term of patent 14 years
U.S. Cl. D22—109



305,562
HUMIDIFIER
Robert Martinez, Stow, Ohio, assignor to The DeVilbiss Company, Toledo, Ohio
Filed Oct. 22, 1987, Ser. No. 111,312
Term of patent 14 years
U.S. Cl. D23—356

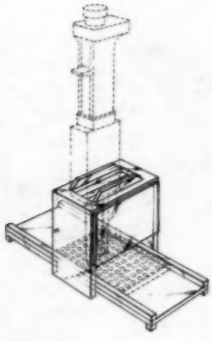


305,563
MASSAGER
Yoshikiyo Yamasaki, Osaka, Japan, assignor to Kabushiki Kaisha Fuji Iryoki, Osaka, Japan
Filed Mar. 3, 1987, Ser. No. 21,062
Term of patent 14 years
U.S. Cl. D24—36

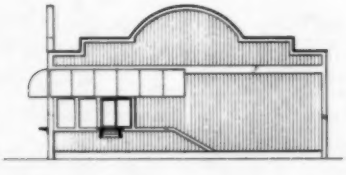


305,564
SUSPENDABLE, THERMALLY INSULATED JACKET FOR I.V. FLUID BAGS
Robert K. Smith, Rte. 2, Box 147, Astoria, Oreg. 97103, and Alan C. Pochert, 3926 NE. 32nd Ave., Portland, Oreg. 97212
Filed Apr. 6, 1987, Ser. No. 35,560
Term of patent 14 years
U.S. Cl. D24—52

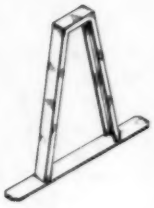
305,565
PIPETTING WORK STATION
Don Malinoff, Granada Hills, Calif., assignor to D.B.M. Scientific Corp., Granada Hills, Calif.
Filed Jun. 30, 1986, Ser. No. 880,484
Term of patent 14 years
U.S. Cl. D24—55



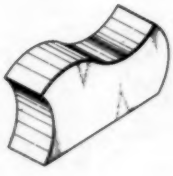
305,566
BUILDING
Robert Cates, Kaufman, and Gary M. Johnson, Dallas, both of Tex., assignors to La Cocina, Inc., Kaufman, Tex.
Filed Dec. 17, 1987, Ser. No. 134,520
Term of patent 14 years
U.S. Cl. D25—18



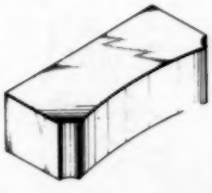
305,567
STAND FOR SUPPORTING PANELS ON EDGE
Ernest D. Scott, 12316 5th NE., Seattle, Wash. 98125
Filed Sep. 10, 1986, Ser. No. 905,986
Term of patent 14 years
U.S. Cl. D25—67



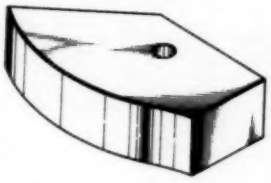
305,568
TILE
Kiyoshi Sakata, Tokyo, Japan, assignor to Park Kyung Hee, Tokyo, Japan
Filed May 18, 1987, Ser. No. 51,282
Claims priority, application Japan, Nov. 19, 1986, 61-45446
Term of patent 14 years
U.S. Cl. D25—113



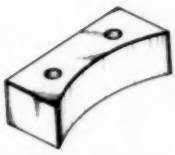
305,569
TILE
Kiyoshi Sakata, Tokyo, Japan, assignor to Park Kyung Hee, Tokyo, Japan
Filed May 18, 1987, Ser. No. 51,283
Claims priority, application Japan, Nov. 21, 1986, 61-45859
Term of patent 14 years
U.S. Cl. D25—113



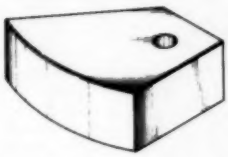
305,570
BRICK
Kiyoshi Sakata, Tokyo, Japan, assignor to Park Kyung Hee, Tokyo, Japan
Filed Apr. 10, 1987, Ser. No. 38,887
Claims priority, application Japan, Oct. 15, 1986, 61-40563
Term of patent 14 years
U.S. Cl. D25—114



305,571
BRICK
Kiyoshi Sakata, Tokyo, Japan, assignor to Park Kyung Hee, Tokyo, Japan
Filed Apr. 10, 1987, Ser. No. 38,888
Claims priority, application Japan, Oct. 15, 1986, 61-40557
Term of patent 14 years
U.S. Cl. D25—114

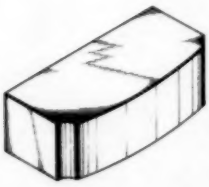


305,572
BRICK
Kiyoshi Sakata, Tokyo, Japan, assignor to Park Kyung Hee, Tokyo, Japan
Filed Apr. 10, 1987, Ser. No. 38,890
Claims priority, application Japan, Oct. 15, 1986, 61-40561
Term of patent 14 years
U.S. Cl. D25—114



305,573
BRICK
Kiyoshi Sakata, Tokyo, Japan, assignor to Park Hyung Hee, Tokyo, Japan
Filed Apr. 10, 1987, Ser. No. 38,892
Claims priority, application Japan, Oct. 15, 1986, 61-40562
Term of patent 14 years
U.S. Cl. D25—114

305,574
BRICK
Kiyoshi Sakata, Tokyo, Japan, assignor to Park Kyung Hee, Tokyo, Japan
Filed May 18, 1987, Ser. No. 51,284
Claims priority, application Japan, Nov. 21, 1986, 61-45860
Term of patent 14 years
U.S. Cl. D25—113



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 16TH DAY OF JANUARY, 1990

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. Finkl & Sons Co.: *See*—
Finkl, Charles W.; Liimatainen, Bruce; and Philbrick, Herbert S., Jr., 4,894,087, Cl. 75-10.390.

AATON R.G.: *See*—
Beauviala, Jean-Pierre, 4,893,921, Cl. 352-92.000.

AB Ernol: *See*—
Borjesson, Hans, 4,893,737, Cl. 222-360.000.

AB Ferrosan: *See*—
Hernestam, Sven E. H.; Nilsson, Nils A.; and Willard Lars-Olof, 4,894,221, Cl. 424-54.000.

AB Tetra Pak: *See*—
Ahrne , Lennart, 4,894,243, Cl. 426-43.000.

Abdel-Magid, Ahmed F.: *See*—
Skotnicki, Jerauld S.; and Abdel-Magid, Ahmed F., 4,894,374, Cl. 514-230.500.

Abe, Fumio; and Mori, Hiroshi, to NGK Insulators, Ltd. Honeycomb structure for fluid filtration. 4,894,160, Cl. 210-510.100.

Abe, Hiraku; Shimojima, Yoji; and Takahashi, Yoshihiro. Optical rotary encoder. 4,894,533, Cl. 250-231.0SE.

Abel, Heinz: *See*—
Topfl, Rosemarie; and Abel, Heinz, 4,894,183, Cl. 252-358.000.

ABG SEMCA: *See*—
Balducci, David, 4,893,748, Cl. 237-2.00A.

Abiru, Norifumi: *See*—
Ohdai, Yozo; Abiru, Norifumi; and Ohbayashi, Eiji, 4,893,491, Cl. 72-137.000.

Abo, Takaaki: *See*—
Takahashi, Mikio; Moribe, Yoshihiro; Maekawa, Hideo; Abo, Takaaki; Yamamoto, Yasuo; Nakamura, Shigeo; and Beppu, Osamu, 4,894,735, Cl. 360-97.010.

Abolins, Visvaldis; Golba, Joseph C., Jr.; and Morelli, Thomas A., to General Electric Company. Polyphenylene compositions having improved melt behavior and impact. 4,894,402, Cl. 524-157.000.

Abraham, Robert S.; and Koehler, Dennis L., to Abraham, Robert S. Method and apparatus for jacking basement walls. 4,893,784, Cl. 254-100.000.

Accumulatorenfabrik Sonnenschein GmbH: *See*—
Kugler, Wolgang, 4,894,300, Cl. 429-190.000.

Acer Incorporated: *See*—
Hung, Chan C., 4,894,718, Cl. 358-139.000.

Adam, Jean-Marie, to Ciba-Geigy Corporation. Surflonated azo dyes containing a diazo component consisting of a two ring heterocycle with an aminophenylene group. 4,894,447, Cl. 534-775.000.

Adams, Norman S., to Trinity Industries, Inc. Railway car conversion to gondola car. 4,893,568, Cl. 105-416.000.

Adams, William H.: *See*—
Kehayias, Joseph J.; Joel, Darrel D.; Adams, William H.; and Stein, Harry L., 4,893,627, Cl. 128-654.000.

Adamson, Ronald B., to General Electric Company. Nuclear fuel element having oxidation resistant cladding. 4,894,203, Cl. 376-416.000.

Adeka Argus Chemical Co. Ltd.: *See*—
Haruna, Tohru; Takahashi, Masayuki; and Nishikawa, Kazunori, 4,894,400, Cl. 524-91.000.

Adelmann, Harry W.; and Tomcik, James D., to American Telephone and Telegraph Company; and AT&T Bell Laborstories. Time stamping for packet system nodes. 4,894,823, Cl. 370-60.000.

Aderhold, Clemens; and Rohrborn, Hans-Joachim, to Metallgesellschaft Aktiengesellschaft. Process for producing barium sulfate with reactive surface. 4,894,093, Cl. 106-461.000.

Advanced Micro Devices, Inc.: *See*—
Ibok, Effiong E., 4,894,353, Cl. 437-239.000.
Kubinec, James J., 4,894,626, Cl. 333-101.000.

Advanced Surgical Intervention, Inc.: *See*—
Rosenbluth, Robert F., 4,893,623, Cl. 128-343.000.

Aerospatiale Societe Nationale Industrielle: *See*—
Le Goff, Jean-Francois, 4,893,963, Cl. 403-322.000.

AG Communication Systems Corporation: *See*—
Belanger, Thomas D., Jr., 4,894,258, Cl. 427-103.000.
Conforti, Joseph A., 4,894,769, Cl. 364-200.000.

Agen Limited: *See*—
Hillyard, Carmel J.; Rylatt, Dennis B.; Kemp, Bruce E.; and Bundesen, Peter G., 4,894,347, Cl. 436-540.000.

Agency of Industrial Science & Technology: *See*—
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Robertson, Albert W., 4,893,562, Cl. 101-425.000.

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Alexander, Robert L., to Chevron Research Company. Method of changing well fluid. 4,893,684, Cl. 175-65.000.

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Tramezzani, Giancarlo, 4,893,977, Cl. 411-278.000.

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Clausen, Eivind, 4,894,743, Cl. 360-128.000.

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Ratzkin, Barry J.; and Fisher, Carlos A., 4,894,331, Cl. 435-94.000.

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Melnik, George; Amrein, Bruce; McCoy, Curtis L.; and Martin, James A., 4,893,599, Cl. 123-198.00D.

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Anthony, William M., to Allied-Signal Inc. Locking device for engagement onto bolt heads. 4,893,975, Cl. 411-87.000.

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Archer, Virgil L.; and Cox, M. Keith, 4,894,207, Cl. 422-292.000.
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Armbruster, Robert F.; Eadara, Rajan; and Miller, William L., to Ciba-Geigy Corporation. Accelerated curing systems for epoxy resins. 4,894,431, Cl. 528-90.000.
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Gulbins, Erich; and Ley, Gregor, 4,894,261, Cl. 427-379.000.
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Billmyre, Richard D. Liquid recovery system and method. 4,894,170, Cl. 210-712.000.

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Moreau, Jacques-Pierre; and Kitchell, Judith P., 4,894,231, Cl. 424-426.000.

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Block, Steven J. Biological filtration device. 4,894,149, Cl. 210-101.000.
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Blum, Holger. Process for preparing thiophene derivatives. 4,894,463, Cl. 548-303.000.
Blum, Patricia R., to Standard Oil Company, The. Vapor phase oxidation or styrene to styrene oxide. 4,894,467, Cl. 549-534.000.
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Huling, Don W., 4,893,471, Cl. 60-204.000.
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Boin, Bernard; and Bouverie, Alain P. C. Mixing arm for a domestic food processor. 4,893,760, Cl. 241-282.200.
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Bolduc, Lee R. Aerosol dispenser for dual liquids. 4,893,730, Cl. 222-80.000.
Bollfrass, Charles A.: *See*—
Chelette, K. Darrel; and Bollfrass, Charles A., 4,893,844, Cl. 285-113.000.
Bommarito, Alexander A. Method and apparatus for clearing occluded lumens of enteral feeding tubes. 4,894,056, Cl. 604-267.000.
Bongen, Francis W.; Combs, Richard D.; Foster, James C.; and Godfrey, Donald G., to Ransburg Corporation. Coating material orifice clogging indication method and apparatus. 4,894,252, Cl. 427-8.000.
Bonnet, Evelyne; Gagnieur, Andre; and Gurtner, Bernard, to Atochem. Flame resistant compositions and method of using same. 4,894,187, Cl. 252-609.000.
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Borbely, Alex; and Molla, Jaynal, to Duracell Inc. Cathode for zinc air cells. 4,894,296, Cl. 429-27.000.
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Borello, Marco, to Salvarani Industrie S.p.A. Modular kitchen unit. 4,893,885, Cl. 312-250.000.
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Bargar, Thomas M.; Borersma, Robert J.; and Creemer, Lawrence C., 4,894,389, Cl. 514-438.000.
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Mahlich, Gotthard C.; and Borgmann, Michael, 4,893,422, Cl. 38-77.300.
Borjesson, Hans, to AB Ernol. Dispensing apparatus. 4,893,737, Cl. 222-360.000.
Bornack, Walter K., Jr.; Williams, Roy C.; and McNally, Keith R., to Union Camp Corporation. Water dispersible polyamide diethanolamine ester. 4,894,433, Cl. 528-272.000.
Borowiec, Joseph C., to General Electric Company. Starting means, with piezoelectrically-located capacitive starting electrodes, for HID lamps. 4,894,589, Cl. 315-248.000.
Borrod, Guy; and Lacroix, Guy, to Rhone-Poulenc Agrochimie. N-sulphonyl-N-(N'-phosphonomethylglycyl)amine. 4,894,082, Cl. 71-87.000.
Borzenski, Frank J.; and Nortey, Narku O., to Farrel Corporation. Mixing machine with non-intermeshing pair of rotors driven solely at the same rotor speed in opposite directions and having a predetermined rotational alignment relationship between the two counter-rotating rotors. 4,893,936, Cl. 366-76.000.
Bos, Willem; and Fanciullo, Martin, to Phenix Heat Pump Systems, Inc. Three function heat pump system with one way receiver. 4,893,476, Cl. 62-79.000.
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Boucher, Robert J. Combustion furnace. 4,893,570, Cl. 110-203.000.
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Boulanger, Roger: *See*—
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Bourcier, Henri; and Turon Lacarrieu, Pierre, to U.S. Philips Corporation. High-power illumination device for a camera. 4,894,677, Cl. 354-403.000.
Boutin, Jean; Brun, Pierre; and Lamaze, Airy-Pierre, to Compagnie Europeenne du Zirconium Cezus. Apparatus for producing metal zirconium by the reduction of zirconium tetrachloride. 4,893,790, Cl. 266-168.000.
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Boin, Bernard; and Bouverie, Alain P. C., 4,893,760, Cl. 241-282.200.
Bowen, William D. Reamer guide for primary sewer line taps. 4,893,841, Cl. 285-15.000.
Bowles, Howard R.: *See*—
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BP Chemicals Limited: *See*—
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Seidelmann, Dieter; Schmiechen, Ralph; Huth, Andreas; Rahtz, Dieter; Braestrup, Claus T.; and Engelstoft, Mogens, 4,894,377, Cl. 514-292.000.
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Brammer, Norman; and Jennings, Charles E., to Vetco Gray Inc. Guidelineless reentry system with retracting rollers. 4,893,677, Cl. 166-341.000.
Brammer, Norman, to Vetco Gray Inc. Wellhead tieback system with locking dogs. 4,893,842, Cl. 285-24.000.
Brandes, Wilhelm: *See*—
Holmwood, Graham; Kraatz, Udo; Buchel, Karl H.; Brandes, Wilhelm; Dutzmann, Stefan; and Reinecke, Paul, 4,894,383, Cl. 514-383.000.
Schade, Gerold; Brandes, Wilhelm; and Hanssler, Gerd, 4,894,381, Cl. 514-383.000.
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Brantingham, Duane L.; and Reedy, Patrick J., to General Motors Corporation. Lamp socket terminal. 4,894,027, Cl. 439-699.000.
Brault, Alfred F., to Davidson Textron Inc. Apparatus for molding multi-colored plastic shells. 4,894,004, Cl. 425-435.000.
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Pacher, Lothar; and Schiebelhuth, Heinz, 4,894,813, Cl. 368-256.000.

Wunder, Dieter; and Henning, Hans-Jurgen, 4,893,552, Cl. 99-299.000.

Braun, Erwin; and Grimm, Eberhard, to Schubert & Salzer Maschinenfabrik Aktiengesellschaft. Open-end spinning machine and process for the start-up of such a device. 4,893,462, Cl. 57-302.000.

Braun, Ryszard, to Eastman Kodak Company. Apparatus and method for suspending solids. 4,893,937, Cl. 366-136.000.

Bray, Robert S., Jr., to Trinity Computing Systems, Inc. Apparatus and method for analyzing physiological conditions within an organ of a living body. 4,893,630, Cl. 128-671.000.

Brehme, Bodo. Method and apparatus for tacking together the copies of multicopy forms. 4,894,109, Cl. 156-256.000.

Breit, Henry F.; Augustos, Karen A.; and Gondusky, Joseph M., to Texas Instruments Incorporated. Circuit system, a composite metal material for use therein, and a method for making the material. 4,894,293, Cl. 428-614.000.

Brennan, Thomas M.; and Hendrick, Michael E., to Pfizer Inc. Branched amides of L-aspartyl-D-amino acid dipeptides. 4,894,464, Cl. 549-88.000.

Breon, Mark S.; and Ecklund, Leslie L., to Eaton Corporation. Retaining cage for check-valves and slack adjusters using same. 4,894,047, Cl. 474-110.000.

Breton, Heimo: *See*—
Berger, Lutz; Breton, Heimo; Giraud, Helmut; Krieg, Gunther; Gunther, Horst; and Schmitt, Gerhard, 4,894,603, Cl. 324-639.000.

Bridgestone Corporation: *See*—
Shimada, Noboru; Hattori, Iwakazu; Sakakibara, Mitsuhiko; Oshima, Noboru; Hamada, Tatsuro; Fukuoka, Hiromi; and Fujimaki, Tatsuo, 4,894,409, Cl. 524-492.000.

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Cloke, Frederick G. N., 4,894,446, Cl. 534-15.000.
Dave, Dilip; Holt, Andrew; and McNiff, Timothy K., 4,894,189, Cl. 264-15.000.

British Telecommunications public limited company: *See*—
Cook, John W., 4,894,864, Cl. 379-398.000.
Mallinson, Stephen R., 4,893,907, Cl. 350-350.00S.

Brodart Co.: *See*—
Pugliese, Joseph S.; and Garman, Charles L., 4,893,837, Cl. 281-31.000.

Broekhoven, Paul V.; Fitzmartin, Daniel; Blasche, Paul; Cox, Duncan B., Jr.; and Upadhyay, Triveni, to Charles Stark Draper Laboratory, Inc., The. Precorrelation digital spread spectrum receiver. 4,894,842, Cl. 375-1.000.

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Sakai, Jun, 4,894,310, Cl. 430-138.000.

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Brown, Leonard C. Vending machine having plural compartments which are independently selected and controlled. 4,893,705, Cl. 194-211.000.

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Lauterbach, John H., 4,893,638, Cl. 131-364.000.

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Baker, Don R.; and Brownell, Keith H., 4,894,379, Cl. 514-332.000.

Browning, Bruce W. Control unit for chain shifter. 4,894,046, Cl. 474-78.000.

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Bruns, Wolfgang: *See*—
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Davis, James A.; and Mayer, William B., 4,894,602, Cl. 322-38.000.

Bryant, Michael L. to BGF Industries, Inc. Bonded glass fabric edge. 4,894,276, Cl. 428-193.000.

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Buchel, Karl H.: *See*—
Elbe, Hans-Ludwig; Holmwood, Graham; Regel, Erik; Buchel, Karl H.; Schaller, Klaus; and Plempel, Manfred, 4,894,382, Cl. 514-383.000.
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Baughman, Ray H.; Buff, Ernest D.; Eckhardt, Helmut; and Fuchs, Gerhard H., 4,893,902, Cl. 350-331.00R.

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Bultendijk, Pieter, to U.S. Philips Corporation. Integrated current-mirror arrangement comprising vertical transistors. 4,894,622, Cl. 330-288.000.

Bujese, David P. Transfer roller. 4,894,686, Cl. 355-271.000.

Bullock, Peter W., to Hughes Aircraft Company. Ultrasonic laser soldering. 4,893,742, Cl. 228-110.000.

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Aschwanden, Felix; and Bart, Theodor E., 4,894,716, Cl. 358-105.000.
Smith, Edgar M., 4,894,527, Cl. 250-214.0AL.

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Thomas, Oomman P.; Peffley, Richard D.; and Burt, Earl E., III, 4,894,403, Cl. 524-216.000.

Burt, Edward A., to Ethyl Corporation. Method of making cyclic aryl chlorophosphites. 4,894,481, Cl. 568-12.000.

Busch, Lloyd E.; Walters, Paul W.; and Zandona, Oliver, to Ashland Oil, Inc. Combination process for upgrading residual oils. 4,894,141, Cl. 208-73.000.

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Guinn, Perry W.; and Mills, Gary N., 4,894,342, Cl. 435-291.000.

C. R. Onsrud, Inc.: *See*—
Onsrud, Thomas C., 4,893,661, Cl. 144-134.00A.

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Wilchek, Meir; and Cabrera, Karin, 4,894,468, Cl. 556-416.000.

Caimi, Frank M., to Mine Safety Appliances Company. Evanescent sensor. 4,893,894, Cl. 350-96.290.

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Mason, Benjamin, 4,893,489, Cl. 72-8.000.

Calgon Corporation: *See*—
Myers, Ronald R.; and Fink, Jack E., 4,894,346, Cl. 436-85.000.

Callahan, Michael. Additive color-mixing light fixture employing a single moveable multi-filter array. 4,894,760, Cl. 362-293.000.

Cambridge Instruments Inc.: *See*—
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Campagna, Anthony J.: *See*—
Bartial, Dennis C.; and Campagna, Anthony J., 4,893,617, Cl. 128-90.000.

Canadian Patents & Development Ltd.: *See*—
Blackford, Bradford L.; Dahn, Douglas C.; and Jericho, Manfred H., 4,894,537, Cl. 250-306.000.

Jen, Cheng K.; and Farnell, Gerald W., 4,894,806, Cl. 367-7.000.
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Ward, Adele E.; Ward, J. R. Kingsley; Lunau, Kevin R.; Stringer, Jeffrey D.; Royce, John H.; and Moore, A. Edward, 4,893,826, Cl. 280-87.021.
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Hamana, Junji; Hara, Shinichi; and Miyagi, Makoto, 4,894,737, Cl. 360-130.210.
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Masuda, Takashi, 4,894,670, Cl. 351-214.000.
Matsuda, Hiroshi; and Miyazaki, Toshihiko, 4,893,581, Cl. 116-201.000.
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Nakajima, Hisao; and Tanabe, Ken, 4,894,684, Cl. 355-207.000.
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Capp, F. William; Gerhardt, Don J.; and Little, Randal A., to Ingersoll-Rand Company. Method of forming a high-temperature-fluid sensor. 4,894,193, Cl. 264-104.000.
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Bayerstock, Richard, 4,894,067, Cl. 48-180.100.
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Denny, Patrick J.; Thomas, Alan E.; and Carnell, Peter J., 4,894,210, Cl. 423-230.000.
Carpenter, Alan P., Jr.; Mabeu, Leo J.; Patz, Michael A.; Tulip, Thomas H.; Linder, Karen E.; Subramanyam, Vinayakam; and Thompson, Jeffery S., to Du Pont de Nemours, E. I., and Company. Metal-isonitrile adducts for preparing radionuclide complexes. 4,894,445, Cl. 534-14.000.
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Miller, William D.; Clenet, Alain J.; and Hines, Charles P., 4,893,868, Cl. 296-219.000.
Carson, Betty J. Sleeping bag for pets. 4,893,586, Cl. 119-1.000.
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Pews, R. Garth; Jackson, Lucinda A.; and Carson, Chrislyn M., 4,894,085, Cl. 71-105.000.
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Cassagne, Jean-Pierre; and Scrive, Laurent, to Gaz De France. Burner system in particular with a high velocity of the burnt gases. 4,894,006, Cl. 431-116.000.
Castain, Joseph S. Safety blade for rotary grass trimmers. 4,893,457, Cl. 56-295.000.
Castelli, Luigi, to Daneco Danieli Ecologia SpA. Method to produce fuel from solid urban refuse, the method including also an organic composted fraction. 4,894,066, Cl. 44-589.000.
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Hsia, Steve K.; and Pang, Chan-Sui, 4,894,802, Cl. 365-185.000.
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Loan, Alan H.; and Klett, Gene R., 4,893,875, Cl. 299-91.000.
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Simmons, Gerald P., 4,893,687, Cl. 180-9.100.
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Cegedur Pechiney: *See*—
Meyer, Philippe, 4,894,096, Cl. 148-2.000.
Central Plastics Company: *See*—
Evans, Harold J., 4,894,521, Cl. 219-535.000.
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Colvin, Arthur E., Jr.; and Hanley, Matthew W., 4,894,152, Cl. 210-198.200.
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Chesworth, Peter; and Lowe, Martin, to Pilkington Brothers P.L.C. Coated glass. 4,894,290, Cl. 428-426.000.
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Childress, James H.: *See*—
Bobinger, David A.; Folarin, Abayomi O.; and Childress, James H., 4,893,857, Cl. 293-136.000.
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Ueni, Kazuhisa; Tsuji, Shinji; Oka, Makoto; Sakano, Shinji; and Chinone, Naoki, 4,894,835, Cl. 372-45.000.
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Knipp, Richard C.; Schmitt, Richard R.; and Chitwood, Kenneth R., 4,893,434, Cl. 43-124.000.
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Chou, Chai J.: *See*—
Farah, Hani; Chou, Chai J.; and Hoenig, Stephen M., 4,894,423, Cl. 525-468.000.
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Christ, F. Richard: *See*—
Knight, Patrica M.; Portnoy, Vladimir; Christ, F. Richard; Alosio, Alan E.; Van Gent, Stanley L.; and Paul, Lyle E., 4,894,062, Cl. 623-6.000.
Christis, Wilhelmus J., to U.S. Philips Corporation. Apparatus using teletext to provide channel identification information in a television transmission system. 4,894,714, Cl. 358-86.000.
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Nogle, Thomas D.; and Klotz, James R., 4,893,652, Cl. 137-596.170.
Chung-Hsing, Chang. Adjustable spanner. 4,893,528, Cl. 81-100.000.
Chung, Hyung-Sub, to Samsung Semiconductor and Telecommunications Co. Ltd. Dual-slope waveform generation circuit. 4,894,560, Cl. 307-263.000.
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Topfl, Rosemarie; and Abel, Heinz, 4,894,183, Cl. 252-358.000.
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Adam, Jean-Marie, 4,894,447, Cl. 534-775.000.
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Braig, Adalbert; Meier, Hans-Rudolf; Leppard, David G.; Wasson, Robert C.; and Phillips, Emyr, 4,894,091, Cl. 106-14.160.
Cournoyer, Richard; Jakopp, Thomas; and Friberg, G. E., 4,894,162, Cl. 210-603.000.
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Nyfeler, Robert; Eckhardt, Wolfgang; Beriger, Ernst; and Kristiansen, Odd, 4,894,380, Cl. 514-340.000.
Rempfler, Hermann; and Kunz, Walter, 4,894,083, Cl. 71-88.000.
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Claiborne, C. Clair: *See*—
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Okamoto, Takeshi; and Mitsutsuka, Syuichi, 4,894,576, Cl. 310-313.00D.
Clark, James A.; and Emmel, Henry J., to Cambridge Instruments Inc. Steromicroscope having stabilizer for preventing tipping of eyepiece assemblies. 4,893,913, Cl. 350-515.000.
Clark, Robert E.: *See*—
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Clausen, Eivind, to Allsop, Inc. Replaceable cleaner/drive members for a tape drive machine. 4,894,743, Cl. 360-128.000.
Clausen, Uwe: *See*—
Ostoja-Starzewski, Karl-Heinz; Witte, Josef; and Clausen, Uwe, 4,893,911, Cl. 350-398.000.
Claxton, James D.; Scheidt, Gerald A.; and Shores, Stanley C., to American Telephone and Telegraph Co., AT&T Bell Laboratories; and AT&T Technologies, Inc. Strengthened buffered optical fiber. 4,893,893, Cl. 350-96.230.
Clenet, Alain J.: *See*—
Miller, William D.; Clenet, Alain J.; and Hines, Charles P., 4,893,868, Cl. 296-219.000.
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Ball, Martin F.; Pavely, Andrew P.; and Taylor, Joseph S., 4,893,725, Cl. 220-269.000.
Murphy, Thomas P., 4,894,136, Cl. 204-212.000.
Coates, Don M., to Du Pont de Nemours, E. I., and Company. Holographic image transfer process. 4,893,887, Cl. 350-3.600.
Coates, Ian H.: *See*—
Butina, Darko; Dowle, Michael D.; and Coates, Ian H., 4,894,387, Cl. 514-415.000.
Coates, Richard C., Jr. Molding system. 4,894,000, Cl. 425-190.000.
Coca-Cola Company, The: *See*—
Richter, Simon J., 4,893,731, Cl. 222-92.000.
Codex Corporation: *See*—
Forney, George D., Jr., 4,894,844, Cl. 375-42.000.
Cody, Charles A.; and Kemnetz, Steven J., to NL Chemicals, Inc. Organophilic clay gellant and processes for preparing organophilic clay gellants. 4,894,182, Cl. 252-315.200.
Coe Manufacturing Company, The: *See*—
Ely, Gary W., 4,893,663, Cl. 144-356.000.
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Aig, Edward R.; Coffey, John W.; Lovey, Allen J.; and Rosenberger, Michael, 4,894,480, Cl. 568-11.000.
Cohen, Jeffrey I.: *See*—
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Cohen, Mitchell S.: *See*—
Sachdev, Krishna G.; Pennington, Keith S.; and Cohen, Mitchell S., 4,894,279, Cl. 428-216.000.
Colak, Sel B., to North American Philips Corporation. Wide band gap semiconductor light emitting devices. 4,894,832, Cl. 372-44.000.
Coldeco S.A.: *See*—
Simon, Laszlo; and Pfau, Jean, 4,894,077, Cl. 62-59.000.
Cole, Joe S.; and Hutcheson, Jack D., to Hilite Industries, Inc. Inline proportioning valve for brake systems. 4,893,878, Cl. 303-9.750.
Coleman Heating & Air Conditioning Products, Inc.: *See*—
Reaser, Greg, 4,893,608, Cl. 126-85.00B.

Colgate-Palmoli ve Company: *See—*
Bianchi, Antonio; and Barletta, Gualtiero, 4,894,117, Cl. 159-49.000.
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Colin Electronics Co., Ltd.: *See—*
Wenzel, Dennis J.; Winter, Dean C.; and Honeyager, Kevin S., 4,893,631, Cl. 128-672.000.

Colligson, Steven L., to United States of America, Navy. Preparation of spheroidal 3-nitro-1,2, 4-triazole-5-one. 4,894,462, Cl. 548-265.000.

Collingwood, Michael R. Portable through-door intercom. 4,894,858, Cl. 379-167.000.

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Colucci, Michael J.: *See—*
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Colvin, Arthur E., Jr.; and Hanley, Matthew W., to Cerex Corporation. Fluid control device. 4,894,152, Cl. 210-198.200.

Combs, Richard D.: *See—*
Bongen, Francis W.; Combs, Richard D.; Foster, James C.; and Godfrey, Donald G., 4,894,252, Cl. 427-8.000.

Comm/Scope, Inc.: *See—*
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Commonwealth of Australia, The: *See—*
Dadswell, Peter J., 4,894,628, Cl. 333-160.000.

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Djega-Mariadassou, Gerald; Tran, Vinh H.; Bureau Tardy, Monique; and Lagrange, Alain, 4,894,185, Cl. 252-519.000.

Compagnie Europeenne du Zirconium Cezus: *See—*
Boutin, Jean; Brun, Pierre; and Lamaze, Airy-Pierre, 4,893,790, Cl. 266-168.000.

Compagnie Generale des Matieres Nucleaires: *See—*
Moret, Jacques M. M.; Peyriere, Nicole; and Textoris, Andre L. N., 4,894,209, Cl. 423-15.000.

Compagnie Maritime D'Expertises: *See—*
Heusi, Rey; Durand, Bernard; and Blanchard, Philippe, 4,894,512, Cl. 219-130.400.

Compton, Ira. Liquid cooled shaker pad retaining sling. 4,893,458, Cl. 56-340.100.

Comtrex Systems Corporation: *See—*
Russell, Robert J., 4,893,454, Cl. 53-492.000.

Condo', Astonino; and Ferrario, Renzo, to Ausimont S.p.A. Process for the production of granular sodium perborate monohydrate having good mechanical strength. 4,894,211, Cl. 423-266.000.

Conforti, Joseph A., to AG Communication Systems Corporation. Increased bandwith for multi-processor access of a common resource. 4,894,769, Cl. 364-200.000.

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Conner, Gail B. Pocket for golf accessories. 4,893,739, Cl. 224-240.000.

Conoco Inc.: *See—*
Newman, Bruce A.; and Chahar, Bharat S., 4,894,144, Cl. 208-131.000.

Consiglio Nazionale Delle Richerche: *See—*
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Container Corporation of America: *See—*
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Container Mfg. Inc.: *See—*
Jennings, J. T., 4,893,732, Cl. 222-109.000.

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Beck, Hans; Waser, Heinz; and Bettschart, Peter, 4,894,499, Cl. 200-404.000.

Conzemius, Robert J., to Iowa State University Research Foundation, Inc. Single event mass spectrometry. 4,894,536, Cl. 250-287.000.

Cook, Boyce W.; and Fiehler, William R., to Sherwood Medical Company. Medical container stopper. 4,893,636, Cl. 128-764.000.

Cook, John W., to British Telecommunications public limited company. Interface circuit. 4,894,864, Cl. 379-398.000.

Cooper, Arthur J.: *See—*
Loza, Roman; Cooper, Arthur J.; and Coffey, Gerald P., 4,894,173, Cl. 252-8.554.

Cooper, David G.; and Sach, George S., to Smith Kline & French Laboratories Limited. Pyridine compounds which have useful histamine-H_2 antagonist activity. 4,894,372, Cl. 514-212.000.

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Bellani, Pietro; and Valcarenghi, Luigi, 4,894,237, Cl. 424-486.000.

Copal Electronics Co., Ltd.: *See—*
Yamazaki, Atsuo; Kaba, Toshiaki; and Sakaguchi, Kenji, 4,894,500, Cl. 200-565.000.

Copp, Carl A., to General Motors Corporation. Guide assembly and guide shoe for a variable angle wobble plate compressor. 4,893,994, Cl. 417-269.000.

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Corneail, Edward A.; and Schultz, Elaine S., to Semec, Inc. Recliner mechanism for automobile seats. 4,893,774, Cl. 248-398.000.

Cornut, Bruno, to Inovelf. Rotor with dynamic pipeting for a centrifuge analysis device. 4,894,204, Cl. 422-72.000.

Coronet-Werke Heinrich Schlerf GmbH: *See—*
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Correa, German E.: *See—*
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Council, Jackie L. Combined trailer hitch and storage bumper. 4,893,856, Cl. 293-106.000.

Counselman, Charles C., to Western Atlas International, Inc. Method and system for determining position on a moving platform, such as a ship, using signals from GPS satellites. 4,894,662, Cl. 342-357.000.

Cournoyer, Richard; Jakopp, Thomas; and Friberg, G. E., to Ciba-Geigy Corporation. Treatment of volatile organic substances at waste water treatment plants. 4,894,162, Cl. 210-603.000.

Courvoisier, Guy: *See—*
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Cox, Duncan B., Jr.: *See—*
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CPC-Rexel, Inc.: *See—*
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Crager, Carl R.; Ramacher, Kenneth F.; and Zawada, Frank A., to Litton Systems, Inc. Crossed-field amplifier bias circuit and method for improved starting. 4,894,586, Cl. 315-39.510.

Craig, Franklin J.: *See—*
Weder, Donald E.; Weder, E. H.; Ruth, Howard M.; King, Michael J.; Craig, Franklin J.; Jones, Larry J.; Badgley, Kenton D.; Snider, Harry J., deceased; Dye, S. Owen; Wiedner, Clay R.; Weder, Bill C.; Langenberg, Robert L.; and Snider, Laura L., 4,893,757, Cl. 241-34.000.

Crane, Lawrence: *See—*
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Crawford, Mark A., to Becton, Dickinson and Company. Flash detection in an over the needle catheter with a restricted needle bore. 4,894,052, Cl. 604-63.000.

Crawford, Roger A.: *See—*
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Creda Limited: *See—*
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Creemer, Lawrence C.: *See—*
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Cresswell, Michael W.: *See—*
Nathanson, Harvey C.; Driver, Michael C.; Cresswell, Michael W.; Freitag, Ronald G.; Alexander, Donald K.; and Yaw, Daniel F., 4,894,114, Cl. 156-631.000.

Cripe, David W.: *See—*
Koenig, Lawrence W.; and Cripe, David W., 4,894,621, Cl. 330-251.000.

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Szlam, Aleksander; Crooks, James W., Jr.; Marks, Curtis G.; and Warner, Charles L., II, 4,894,857, Cl. 379-67.000.

Crosfield Electronics (USA) Limited: *See—*
Gouch, Martin P., 4,893,558, Cl. 101-211.000.

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Graham, Thomas; and Radford, Philip G., 4,894,274, Cl. 428-151.000.

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Simonyi, Sandor; Ternoczky, Gyorgy; Valoczi, Gyorgy; and Toth, Istvan, 4,894,780, Cl. 364-424.100.

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Baughman, Ray H.; Buff, Ernest D.; Eckhardt, Helmut; and Fuchs, Gerhard H., 4,893,902, Cl. 350-331.00R.

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Nyfeler, Robert; Eckhardt, Wolfgang; Beriger, Ernst; and Kristiansen, Odd, 4,894,380, Cl. 514-340.000.

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Artzt, Peter; Dallman, Harald; Ziegler, Kurt; and Egbers, Gerhard, 4,893,461, Cl. 57-261.000.

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Elbe, Hans-Ludwig; Holmwood, Graham; Regel, Erik; Buchel, Karl H.; Schaller, Klaus; and Plempel, Manfred, to Bayer Aktiengesellschaft. Substituted 1,3-diazolyl-2-propanols and their use as antimycotic agents. 4,894,382, Cl. 514-383.000.

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Electro-Nite International NV: *See*—
Knevels, Johan M. J., 4,893,516, Cl. 73-866.500.

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Elliott, Randy D., to Spectra-Physics, Inc. Interface apparatus. 4,894,522, Cl. 235-472.000.

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Elsasser, Dieter; von der Heide, Johann; and Cap, Heinrich, to Papst-Motoren GmbH & Co. KG. Disk storage drive. 4,894,738, Cl. 360-97.100.

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Dekel, Doron, 4,894,776, Cl. 364-413.130.
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Franke, Charles G., 4,893,782, Cl. 251-356.000.
Hildebrandt, Eugene F.; and Ottersbach, Thomas V., 4,894,571, Cl. 310-68.00C.

Emerson, Suzanne U.: *See*—
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Emsens, Michel, 4,893,553, Cl. 99-419.000.
Emsens, Michel, to Emsens Antoine S.A.R.L. Machine for the automatic production of meat and/or vegetable kebabs threaded onto skewers. 4,893,553, Cl. 99-419.000.
Endo, Kazuyuki, to Motorola Inc. Lead frame having projections for resin molding. 4,894,704, Cl. 357-70.000.
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Doehler, Joachim; and Krisko, Jeffrey M., 4,893,584, Cl. 118-723.000.
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Engel, Joseph C.; and Lagree, James L., to Westinghouse Electric Corp. Automatic transfer switch with programmable display. 4,894,796, Cl. 364-900.000.
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Evans, Harold J., to Central Plastics Company. Electric heating element for fusing thermoplastic materials. 4,894,521, Cl. 219-535.000.
Evans, Keith O. Reversible hand warming muff. 4,893,357, Cl. 2-208.000.
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Lagow, Richard J.; Bierschenk, Thomas R.; Juhlke, Timothy J.; and Kawa, Hajimu M., 4,894,484, Cl. 568-615.000.
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Hazelton, Donald R.; and Puydak, Robert C., 4,894,408, Cl. 524-425.000.
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Ho, W. S. Winston; Stogryn, Eugene L.; and Sartori, Guido, 4,894,178, Cl. 252-189.000.
Peiffer, Dennis G.; and Kaladas, Jeff J., 4,894,422, Cl. 525-420.000.
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Farmer, Moses G., to United States of America, National Aeronautics and Space Administration. Cable suspended windmill. 4,894,554, Cl. 290-55.000.
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Farque, Anthony. Electrolyte IR voltage compensator for cathodic protection systems or the like. 4,894,135, Cl. 204-196.000.
Farr, Glyn P. R., to Lucas Industries Public Limited Company. Hydraulic anti-lock braking systems for vehicles. 4,893,881, Cl. 303-113.000.
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Farrington, David L.; Staller, Norman D.; and Whiteside, George D., to Polaroid Corporation. Preflash pseudofocus/exposure control system. 4,894,678, Cl. 354-415.000.
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Feinberg, Bernard; Fryd, Michael; and Leberzammer, Ernst, to Du Pont de Nemours, E. I., and Company. Process for making flexographic printing plates with increased flexibility. 4,894,315, Cl. 430-281.000.
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Fendley, James R.; and Jarosz, John M., to Zenith Electronics Corporation. Factory fixture frame with means for temporarily and removably supporting an in-process tension mask for a color cathode ray tube. 4,894,037, Cl. 445-30.000.
Fenolia, Robert J.; Shepard, Donald F.; and Van Loon, Sharon L., to Martin Marietta Corporation. Optically black pliable foils. 4,894,125, Cl. 204-33.000.
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Fernandes, Roosevelt A. High voltage conductor mounted line powered monitoring system. 4,894,785, Cl. 364-483.000.
Ferrario, Renzo: *See*—
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Ferraro, John R.; Foerster, Philip P.; Rockall, Alan; and Schwarz, Steven R., to United Technologies Corporation. Helicopter cable and equipment guide with shock absorbency. 4,893,767, Cl. 244-118.100.
Ferrigno, Joseph T. Electrically controlled faucet. 4,893,653, Cl. 137-607.000.
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Fetcenko, Michael A.; Kaatz, Thomas; Sumner, Steven P.; and LaRocca, Joseph, to Energy Conversion Devices, Inc. Hydride reactor apparatus for hydrogen comminution of metal hydride hydrogen storage material. 4,893,756, Cl. 241-33.000.

Feuz, John G. Double check valve backflow preventer assembly. 4,893,654, Cl. 137-614.200.

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Fiehler, William R.: *See*—
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Fine, Michael, to Digital Equipment Corporation. Method for maintaining a correct time in a distributed processing system. 4,894,846, Cl. 375-107.000.

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Finkl, Charles W.; Liimatainen, Bruce; and Philbrick, Herbert S., Jr., to A. Finkl & Sons Co. Simplified method and apparatus for treating molten steel. 4,894,087, Cl. 75-10.390.

Finley, John W.: *See*—
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Fisher, Joseph J.: *See*—
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Fitzgibbob, Jeremiah J. Sintered spherical pellets containing clay as a major component useful for gas and oil well proppants. 4,894,285, Cl. 428-402.000.

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Flanigen, Edith M.; Lok, Brent M. T.; Patton, Robert L.; and Wilson, Stephen T., to UOP. Arsenic-aluminum-phosphorus-silicon-oxide molecular sieve compositions. 4,894,213, Cl. 423-328.000.

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Martin, James M.; Fleury, Leo W., Jr.; and Fischer, Michael A., 4,893,679, Cl. 169-39.000.

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Flinn, Robert W. Clamp. 4,893,801, Cl. 269-6.000.

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Folarin, Abayomi O.: *See*—
Bobinger, David A.; Folarin, Abayomi O.; and Childress, James H., 4,893,857, Cl. 293-136.000.

Foley, Geoffrey M. T.: *See*—
Badesha, Santokh S.; Foley, Geoffrey M. T.; and Cherin, Paul, 4,894,307, Cl. 430-128.000.

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Skonieczny, Raymond S.; Ford, Douglas A.; and Pryor, Robert W., 4,893,863, Cl. 296-76.000.

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Foster, James C.: *See*—
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Fowler, Ilania H.; and Hind, J. Charles. Pentatonic ocarina. 4,893,541, Cl. 84-380.00C.

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Franke, Charles G., to Emerson Electric Co. Metallic seat for fluid valve. 4,893,782, Cl. 251-356.000.

Frankel, Eric H. Bundling strap with two adjustable closures. 4,893,381, Cl. 24-16.00R.

Frankenbach, David C., to Hughes Aircraft Company. Method and apparatus for generating video signals. 4,894,653, Cl. 340-703.000.

Frankhuizen, Michiel: *See*—
Ragen, Robert A.; Gabor, Andrew; Weller, Ivor; Frankhuizen, Michiel; and Jagger, Brian E., 4,893,950, Cl. 400-185.000.

Frankowski, Elaine N.: *See*—
Monie, Vijaykumar S.; Frankowski, Elaine N.; Larson, James A.; Metz, Stephen V.; Nasiruddin, Mohammed; Reed, Michael D.; Richardson, Rose Mae M.; Wilsey, Orvil E.; and Wood, William T., 4,894,829, Cl. 371-20.100.

Frano, Francis G., to Illinois Tool Works Inc. Quarter-turn detent twistlock. 4,893,978, Cl. 411-553.000.

Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H.: *See*—
Theurer, Josef; and Praschl, Wilhelm, 4,893,565, Cl. 104-7.200.

Frauenknecht, Josef: *See*—
Annen, Oskar; Beck, Wolfgang; and Frauenknecht, Josef, 4,894,065, Cl. 8-638.000.

Fred Hutchinson Cancer Research Center: *See*—
Matsuura, Hidemitsu; and Hakomori, Sen-itiroh, 4,894,326, Cl. 435-7.000.

Frederick, Gene R.: *See*—
Lane, Andrew P.; Webb, Douglas A.; and Frederick, Gene R., 4,894,352, Cl. 437-238.000.

Free-Flow Packaging Corporation: *See*—
Chang, Ted B.; and Graham, Arthur, 4,894,265, Cl. 428-34.600.

Freeman, Gerard L.: *See*—
Smith, Bernard; Freeman, Gerard L.; and Branovich, Louis E., 4,894,257, Cl. 427-78.000.

Frei, Josef, to Organ-Faser Technology B.V. Device for separating a heterogeneous mass of solid material into fractions. 4,894,148, Cl. 209-479.000.

Frei, Roger E.: *See*—
Chisholm, Bill; and Frei, Roger E., 4,893,650, Cl. 137-539.000.

Freischlag, Eric P.: *See*—
Hemingway, James F.; and Freischlag, Eric P., 4,893,991, Cl. 417-53.000.

Freitag, Ronald G.: *See*—
Nathanson, Harvey C.; Driver, Michael C.; Cresswell, Michael W.; Freitag, Ronald G.; Alexander, Donald K.; and Yaw, Daniel F., 4,894,114, Cl. 156-631.000.

French, William W., to Eastman Kodak Company. Magneto-resistive head with improved sensitivity. 4,894,741, Cl. 360-113.000.

Frenzel, Bertram; Grenzendorfer, Dietmar; Kemter, Heinz; Wuensch, Wolfgang; and Zeisberg, Peter, to VEB Kombinat Textima. Warp-knitting fabric with oblique and diagonal filling threads. 4,893,482, Cl. 66-190.000.

Fresenius AG: *See*—
Polaschegg, Hans-Dietrich, 4,894,164, Cl. 210-646.000.

Friberg, G. E.: *See*—
Cournoyer, Richard; Jakopp, Thomas; and Friberg, G. E., 4,894,162, Cl. 210-603.000.

Friedl, Richard, to LOZ Landis & Gyr Zug AG. Current-transformer arrangement for an electrostatic meter. 4,894,610, Cl. 324-127.000.

Friedman, Maurice, to VIZ Manufacturing Company. Humidity sensing apparatus and method therefor. 4,893,508, Cl. 73-336.500.

Friedmar, Richard M. Display apparatus for visually impaired persons. 4,893,540, Cl. 84-478.000.

Friemel, Wolfgang; Barth, Volker; and Dierks, Hildegund, to Detia Freyberg GmbH. Delayed hydrolysis of metal phosphides. 4,894,230, Cl. 424-409.000.

Fries, Daniel: *See*—
Stomp, Hubert; Heintz, Carlo; Kremer, Andre; Monai, Jean; Fries, Daniel; and Devillet, Serge, 4,893,791, Cl. 266-226.000.

Frings, Gottfried; Hillen, Walter; and Schiebel, Ulrich, to U.S. Philips Corporation. X-ray apparatus for slit radiography. 4,894,850, Cl. 378-62.000.

Frisbee, Claude M.: *See*—
Horsch, Rudolf; and Frisbee, Claude M., 4,893,683, Cl. 172-821.000.

Fritts, David H.: *See*—
Vukson, Stephen P.; Fritts, David H.; Leonard, John F.; and Kim, Kwang Y., 4,894,298, Cl. 429-50.000.

Froes, Francis H.: *See*—
Eylon, Daniel; and Froes, Francis H., 4,893,743, Cl. 228-181.000.

Frusha, John D.; and Lee, Sam S. Illumination apparatus for ornaments. 4,894,757, Cl. 362-104.000.

Fry, Richard L.; Bergsrud, Gerald L.; Maland, Russell J.; and Weldon, James A., to Minnesota Mining and Manufacturing Company. Fan folded abrasive discs. 4,893,438, Cl. 51-394.000.

Fry, Timothy J.; and Greentaner, Lowell T., to General Motors Corporation. Power door lock actuator. 4,893,704, Cl. 192-141.000.

Fryd, Michael: *See*—
Feinberg, Bernard; Fryd, Michael; and Leberzammer, Ernst, 4,894,315, Cl. 430-281.000.

Fuchigami, Yoshio: *See*—
Watanabe, Kazunori; and Fuchigami, Yoshio, 4,894,163, Cl. 210-640.000.

Fuchizawa, Tetsuro: *See*—
Ogawa, Tadashi; Fuchizawa, Tetsuro; Sano, Masaru; Taguchi, Seiichi; and Shiba, Keisuke, 4,894,321, Cl. 430-496.000.

Fuchs, Gerhard H.: *See*—
Baughman, Ray H.; Buff, Ernest D.; Eckhardt, Helmut; and Fuchs, Gerhard H., 4,893,902, Cl. 350-331.00R.

Fuerst, Arpad, to Webasto AG Fahrzeugtechnik. Vehicle roof. 4,893,869, Cl. 296-220.000.

Fuji Jukogyo Kabushiki Kaisha: *See*—
Sato, Tetsuro, 4,893,988, Cl. 416-140.000.
Sogawa, Yoshiyuki, 4,893,501, Cl. 73-118.100.

Fuji Photo Film Co., Ltd.: *See*—
Akao, Mutsuo; Inoue, Koji; and Osanai, Hiroyuki, 4,894,264, Cl. 428-34.200.
Arakawa, Jun; and Mihayashi, Keiji, 4,894,318, Cl. 430-372.000.
Hara, Makoto, 4,894,786, Cl. 364-497.000.
Ikeda, Tadashi; Ogawa, Tadashi; and Okazaki, Masaki, 4,894,319, Cl. 430-383.000.
Kawai, Kiyoshi; and Ihama, Mikio, 4,894,323, Cl. 430-569.000.
Murase, Masakazu; and Shoji, Takashi, 4,894,524, Cl. 250-205.000.
Ogawa, Tadashi; Fuchizawa, Tetsuro; Sano, Masaru; Taguchi, Seiichi; and Shiba, Keisuke, 4,894,321, Cl. 430-496.000.
Okazaki, Yoji; Kamiyama, Koji; and Okazaki, Masaki, 4,893,888, Cl. 350-96.120.
Takahashi, Kenji; Nakamura, Takashi; and Hosoi, Yuichi, 4,894,548, Cl. 250-484.100.
Takayanagi, Takashi; and Kawaguchi, Hideo, 4,894,180, Cl. 252-299.010.
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Fuji Photo Optical Co., Ltd.: *See*—
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Fuji Xerox Co., Ltd.: *See*—
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Fujibayashi, Kentaro: *See*—
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Fujikawa, Takumi: *See*—
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Fujiki, Toshisada; Kondo, Taikichi; Furukawa, Yoshinari; Kato, Kazuaki; Okimoto, Akimichi; and Tsuge, Kenji, to NGK Insulators, Ltd. Electrical measuring device. 4,894,609, Cl. 324-107.000.

Fujimaki, Tatsuo: *See*—
Shimada, Noboru; Hattori, Iwakazu; Sakakibara, Mitsuhiko; Oshima, Noboru; Hamada, Tatsuro; Fukuoka, Hiromi; and Fujimaki, Tatsuo, 4,894,409, Cl. 524-492.000.

Fujimoto, Megumi: *See*—
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Fujimoto, Takeo. Article holder for use in a car door. 4,893,773, Cl. 248-311.200.

Fujimoto, Ted: *See*—
Ashmore, John W.; and Fujimoto, Ted, 4,894,479, Cl. 564-300.000.

Fujimoto, Terutsugu, to Sumitomo Wiring Systems, Ltd. High tension cable and method of manufacture thereof. 4,894,490, Cl. 174-108.000.

Fujioka, Masanobu; and Utaka, Katsuyuki, to Kokusai Denshin Denwa Kabushiki Kaisha. Optical packet switching system using multi-stage combination of light triggering switches. 4,894,818, Cl. 370-3.000.

Fujioka, Masanobu, to Kokusai Denshin Denwa Kabushiki Kaisha. Terminal in communication network for notifying originating party's number. 4,894,861, Cl. 379-374.000.

Fujisawa Pharmaceutical Company, Ltd.: *See*—
Okuhara, Masakuni; Tanaka, Hirokazu; Goto, Toshio; Kino, Tohru; and Hatanaka, Hiroshi, 4,894,366, Cl. 514-63.000.

Fujishiro, Issei: *See*—
Kunii, Hideko; Fujishiro, Issei; Shirai, Yasuto; and Kunii, Tosiyasu, 4,894,771, Cl. 364-200.000.

Fujita, Masayuki; and Oyama, Sakashi, to NEC Corporation. Optical switching device including pivot bearing mechanism. 4,893,891, Cl. 350-96.200.

Fujitsu Limited: *See*—
Nakanishi, Akio; Ikegaya, Ken-ichi; and Naitoh, Takao, 4,894,856, Cl. 379-61.000.

Fujiwara, Masatoshi: *See*—
Kakimoto, Syoichi; Fujiwara, Masatoshi; and Takahashi, Syogo, 4,894,834, Cl. 372-44.000.

Fukuda, Tomiichi. Golf cart system. 4,893,566, Cl. 104-140.000.

Fukuda, Tsuguhiro; and Sato, Hiroshi, to Canon Kabushiki Kaisha. Thermal transfer material. 4,894,288, Cl. 428-422.000.

Fukuda, Yoshihisa: *See*—
Furuno, Kiyotaka; Tanigaki, Hidetoshi; Yano, Kouji; Ozaki, Tadashi; Fukuda, Yoshihisa; Fujikawa, Takumi; and Tanaka, Makoto, 4,894,661, Cl. 342-140.000.

Fukui, Ikuo: *See*—
Kuwata, Satoshi; and Fukui, Ikuo, 4,894,224, Cl. 424-78.000.

Fukui, Ryota; Takagi, Kenichi; Kikuchi, Riichi; Takayama, Kazuo; and Tonegawa, Akira, to Nihon Shinku Gijutsu Kabushiki Kaisha. Hollow cathode ion sources. 4,894,546, Cl. 250-423.00R.

Fukumochi, Yoji: *See*—
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Fukuoka, Hiromi: *See*—
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Fukuoka, Shingoro; Shintomi, Kouichi; Maeda, Ryu; and Shiroyama, Kaisuke, to Furukawa Electric Co., Ltd., The. Low-temperature burnt conductive paste and method of manufacturing printed circuit board. 4,894,184, Cl. 252-512.000.

Funabashi, Tsuneo: *See*—
Iwasaki, Kazuhiko; Funabashi, Tsuneo; Kawasaki, Ikuya; Inayoshi, Hideo; Hasegawa, Atsushi; Yaginuma, Takao; and Kondoh, Eiki, 4,894,768, Cl. 364-200.000.

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Furukawa Denki Kogyo Kabushiki Kaisha: *See*—
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Furukawa Electric Co., Ltd., The: *See*—
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Furukawa, Yoshinari: *See*—
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Furuno Electric Company, Limited: *See*—
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Furusawa, Choji; Shimei, Masato; Ishiguro, Toshiaki; Hattori, Katsuhiko; and Yamaguchi, Hiroyuki, to Aisin Seiki Kabushiki Kaisha; and Kabushiki Kaisha Toyota Chuo Kenkyusho. Speed change control apparatus for automatic transmissions. 4,893,527, Cl. 74-866.000.

Furuta, Tomiyoshi: *See*—
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Furuya, Masayuki: *See*—
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Fusion Systems Corporation: *See*—
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Gabathuler, Jean-Pierre: *See*—
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Gabor, Szalai, to Magyar Vagon es Gepgyar. Centralized wet-brake and other improvements for running gears with adjustable wheel track. 4,893,525, Cl. 74-710.500.

Gadan Maskinfabrik A/S: *See*—
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Gadebusch, Hans H.; and Valiant, Mary E., to Merck & Co., Inc. Method of controlling mycotic infections and compositions therefor. 4,894,375, Cl. 514-249.000.

Gaffar, Abdul: *See*—
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Gagnon, Kenneth M., Sr. Self-aligning decoy. 4,893,428, Cl. 43-3.000.
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Gallucci, Robert R., to General Electric Company. Low gloss thermoplastic blends. 4,894,416, Cl. 525-74.000.
Gambert, Rudolf; and Kuehn, Uwe, to Drageriwerk AG. Electrochemical gaseous messurement cell. 4,894,138, Cl. 204-415.000.
GAO Gesellschaft fur Automation und Organisation mbH: *See*—
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Garcia, Michel: *See*—
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Garrett, Steven L.; and Gardner, David L., to United States of America, Navy. Multiple axis, fiber optic interferometric seismic sensor. 4,893,930, Cl. 356-345.000.
Gartner, Georg F.; and Janiel, Peter A., to U.S. Philips Corporation. Process for glow-discharge-activated reactive deposition of metal from a gas phase. 4,894,256, Cl. 427-39.000.
Gas Research Institute: *See*—
Woodson, Carl W., 4,893,467, Cl. 60-39.300.
Gasbjerg, Knud, to Gadan Maskinfabrik A/S. Apparatus for distributing cheese coagulum in a vat. 4,893,554, Cl. 99-458.000.
Gasquet, Denis: *See*—
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Gassaway, Mark M. Security mount. 4,893,777, Cl. 248-551.000.
Gassenhuber, Helmut; and Ziegler, Walter, to LRE Relais & Elektronik GmbH. Differential-reflectance photometer. 4,894,552, Cl. 250-572.000.
Gay, Benjamin A., to Gay & Wagner Research Corporation. Air pressure activated collet. 4,893,761, Cl. 242-46.400.
Gay, Dwight S.; and Hoornstra, John W., to Gunnell, Inc. Chair construction for incapacitated persons. 4,893,827, Cl. 280-250.100.
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General Electric Company: *See*—
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Eichelberger, Charles W.; Wojnarowski, Robert J.; and Welles, Kenneth B., II, 4,894,115, Cl. 156-643.000.
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Hwang, Jyh-Ping; Lin, Wen-Tai; Milkovic, Miran; and Noujaim, Sharbel E., 4,894,656, Cl. 341-120.000.
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Lee, Ching P.; Vaughn, Eugene T.; and Palmer, Nicholas C., 4,893,987, Cl. 416-92.000.
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Thomas, Charles E., 4,894,644, Cl. 340-680.000.
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Joshi, Shrikant M.; Whitehead, Lee C.; and Oddi, Frederick V., 4,893,670, Cl. 165-40.000.
Kennedy, Lawrence C.; and Strader, James O., 4,893,703, Cl. 192-58.00B.
Lederman, Frederick E., 4,893,702, Cl. 192-45.000.
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McClain, Michael J.; Buchanan, Harry C., Jr.; and Reed, Glenn R., 4,893,865, Cl. 296-192.000.
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Geoghegan, Edward J.; Mulligan, Seamus; and Panoz, Donald E., to Elan Corporation plc. Controlled absorption diltiazem formulation for once-daily administration. 4,894,240, Cl. 424-497.000.
George, Raymond A.: *See*—
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Georges, Michael K.; Alexandru, Lupu; Dale, William J.; Szabo, Paul D.; and Nelson, Robert A., to Xerox Corporation. Processes for the preparation of crosslinked copolymers. 4,894,309, Cl. 430-137.000.
Georgiev, Georgi G.: *See*—
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Gerhardt, Don J.: *See*—
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Lazcano-Navarro, Artaro; and Geronimo-Torres, Andres, 4,894,122, Cl. 201-17.000.
Gerrard, Richard A., to Richard A. Gerrard. Filter for a fluidized bed powder coating apparatus. 4,894,075, Cl. 55-484.000.
Gervasi, Vito. Cutting tool. 4,893,662, Cl. 144-230.000.
Giacomini, Marco, to Sirio S.p.A. Non-return valve for supply cocks. 4,893,644, Cl. 137-218.000.
Giddings, John C., to University of Utah. Thin channel split flow process and apparatus for particle fractionation. 4,894,146, Cl. 209-12.000.
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Giordani, Attilio G.; and Sargeant, Jack W., to Teledyne Industries, Inc. Wind-resistant outdoor heating appliance. 4,893,609, Cl. 126-350.00R.

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Berger, Lutz; Breton, Heimo; Giraud, Helmut; Krieg, Gunther; Gunther, Horst; and Schmitt, Gerhard, 4,894,603, Cl. 324-639.000.

Girman, Richard L.; Palmer, Gary E.; and Gotsis, Gust G., to Hako Minuteman, Inc.; and Restaurant Technology, Inc. Dual mode floor scrubbing machine. 4,893,375, Cl. 15-321.000.

Gladych, Richard W.: *See*—
Harris, Daniel J.; and Gladych, Richard W., 4,893,852, Cl. 292-251.500.

Glaenzer-Spicer: *See*—
Poulin, Bernard; and Verbrugge, Francois, 4,894,044, Cl. 464-111.000.

Glau, Gordon, to Kraft Systems, Inc. Cable cover assembly. 4,894,491, Cl. 174-135.000.

Glaverbel: *See*—
Neusy, Hubert, 4,894,081, Cl. 65-142.000.
Servais, Albert; and Somerhausen, Bernard, 4,894,278, Cl. 428-201.000.

Glaxo Group Limited: *See*—
Butina, Darko; Dowle, Michael D.; and Coates, Ian H., 4,894,387, Cl. 514-415.000.

Glenn, Gregory S.; and Mostjar, William O., to Hughes Aircraft Company. Welder control system. 4,894,508, Cl. 219-110.000.

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Phillips, Richard J.; Glicksman, Leon R.; and Larson, Ralph, 4,894,709, Cl. 357-82.000.

Glock, Gaston. Automatic pistol. 4,893,546, Cl. 89-145.000.

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Walden, Donald M., Jr.; and Glueckstein, John P., 4,894,647, Cl. 340-815.200.

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Bastz, Henning; and Rittscher, Dieter, 4,894,550, Cl. 250-506.100.

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Tanaka, Hisakatsu; Rokutan, Takao; and Gocho, Nagahiro, 4,894,817, Cl. 369-54.000.

Godbersen, Byron L. Boat trailer roller bunk apparatus. 4,893,828, Cl. 280-414.100.

Godfrey, Donald G.: *See*—
Bongen, Francis W.; Combs, Richard D.; Foster, James C.; and Godfrey, Donald G., 4,894,252, Cl. 427-8.000.

Godshalk, Russell L.; and Shope, Gary W., to Eastman Kodak Company. Security printer/copier. 4,894,805, Cl. 365-222.000.

Goetz, Albert: *See*—
Schwemmer, Martin; and Goetz, Albert, 4,893,485, Cl. 68-13.00R.

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Gokan, Akira; and Wakabayashi, Hiroshi, to New Japan Radio Co., Ltd. Combined amplitude modulator and frequency converter. 4,894,624, Cl. 332-164.000.

Golba, Joseph C., Jr.: *See*—
Abolins, Visvaldis; Golba, Joseph C., Jr.; and Morelli, Thomas A., 4,894,402, Cl. 524-157.000.

Goldbach, Manfred: *See*—
Heitmann, Uwe; and Goldbach, Manfred, 4,893,640, Cl. 131-84.400.

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Goldberg, Joshua I.: *See*—
Lardiere, Benjamin G., Jr.; and Goldberg, Joshua I., 4,894,569, Cl. 310-10.000.

Goldmann, Siegfried; Bischoff, Hilmar; Puls, Walter; Bender, Joachim; Petzinna, Dieter; and Schlossmann, Klaus, to Bayer Aktiengesellschaft. Lowering blood sugar with novel 4-thienyl-dihydropyridines. 4,894,378, Cl. 514-302.000.

Goldstar Co., Ltd.: *See*—
Moon, Ik H., 4,894,719, Cl. 358-153.000.
Oh, Ki T., 4,894,502, Cl. 219-10.55M.

Gondusky, Joseph M.: *See*—
Breit, Henry F.; Augustos, Karen A.; and Gondusky, Joseph M., 4,894,293, Cl. 428-614.000.

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Lombardi, John J.; Handline, Michael; and Goode, Gary, 4,893,719, Cl. 220-1.00T.

Goodman, Robert M. Data acquisition and recording system. 4,894,728, Cl. 360-6.000.

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Reuter, Rene F.; and Welter, Thomas N. H., 4,893,665, Cl. 152-451.000.
Scriver, Richard M., 4,894,420, Cl. 525-237.000.

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Goto, Shinichi: *See*—
Ishida, Syuichi; Goto, Shinichi; and Muramatsu, Kimio, 4,893,521, Cl. 74-552.000.

Goto, Toshihide: *See*—
Akamatsu, Yoshinobu; Kotani, Morikatu; Goto, Toshihide; Hibi, Kenji; and Matsushima, Toshihiko, 4,893,387, Cl. 29-121.100.

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Girman, Richard L.; Palmer, Gary E.; and Gotsis, Gust G., 4,893,375, Cl. 15-321.000.

Gouch, Martin P., to Crosfield Electronics (USA) Limited. Image reproduction. 4,893,558, Cl. 101-211.000.

Gozen, Toshikazu: *See*—
Tanaka, Hiroyuki; Satake, Takeshi; Gozen, Toshikazu; Suzuki, Toshiya; and Utsumi, Atsushi, 4,893,896, Cl. 350-96.310.

Gozzo, Franco: *See*—
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Grabner, Roy W.: *See*—
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Grabowski, Edward J. J.; and Hughes, David L., to Merck & Co., Inc. Process for 2-(aminoalkylthio) carbapenems. 4,894,450, Cl. 540-350.000.

Graf, Ralph A., to Gtsg & Cir. AG. Card clothing for flats of a carding machine. 4,893,380, Cl. 19-114.000.

Graham, Arthur: *See*—
Chang, Ted B.; and Graham, Arthur, 4,894,265, Cl. 428-34.600.

Graham, James M.; and Schaack, Edward F., to Duraflite, Inc. Stairway apparatus and method of manufacture. 4,893,442, Cl. 52-184.000.

Graham, Neil B.: *See*—
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Gramss, Rainer, to ITW-ATECO, GmbH. Damping device, in particular for operating members in automotive vehicles. 4,893,700, Cl. 188-306.000.

GraPar Corporation: *See*—
Parslow, Harold W., Jr.; and Parslow, Timothy M., 4,893,642, Cl. 134-66.000.

Graphics LX Corp.: *See*—
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Gray, Derick, to Signam Limited. Protective shield for a vehicle lamp assembly. 4,894,761, Cl. 362-376.000.

Gray, Paul E., to Rohr Industries, Inc. Oxidation resistant refractory coated carbon-carbon composites. 4,894,286, Cl. 428-408.000.

Green, Byron D.: *See*—
Caledonia, George E.; Krech, Robert H.; Green, Byron D.; and Pirri, Anthony N., 4,894,511, Cl. 219-121.520.

Green, David T.; and Korthoff, Herbert W., to United States Surgical Corporation. Method of stapling tubular body organs. 4,893,622, Cl. 227-180.000.

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Greenfield, Lawrence I.; Kaplan, Donald A.; and Nitecki, Dauste E., to Cetus Corporation. Toxin conjugates. 4,894,443, Cl. 530-388.000.

Greenman, Barbara J.: *See*—
Butler, Donald E.; and Greenman, Barbara J., 4,894,476, Cl. 562-504.000.

Greentaner, Lowell T.: *See*—
Fry, Timothy J.; and Greentaner, Lowell T., 4,893,704, Cl. 192-141.000.

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Greer, Sheldon B. Method and materials for sensitizing neoplastic tissue to radiation. 4,894,364, Cl. 514-49.000.

Gregory, Thomas D.: *See*—
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Grimm, Eberhard: *See*—
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Grimm, Peter: *See*—
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Grinnell Corporation: *See*—
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Groff, E. Terry. Apparatus for configuring an extrudate. 4,894,002, Cl. 425-319.000.

Grogler, Gerhard; Hess, Heinrich; and Kopp, Richard, to Bayer Aktiengesellschaft. Process for the preparation of polyurethanes containing uretdione rings. 4,894,429, Cl. 528-45.000.

Gronert, Heinz; Vetter, Jochen; Eckert, Manfred; von Petersdorff, Henning; and Munich, Johann, to MAN Technologies GmbH. De-

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Gross, Helmut; Hoptner, Wolfgang; and Kaiser, Gunther, to Robert Bosch GmbH. Process for fuel metering. 4,893,602, Cl. 123-492.000.

Grosshauser, Heinrich K.; and Schneider, Georg, to Koenig & Bauer Aktiengesellschaft. Printing plate fastening and tensioning assembly. 4,893,561, Cl. 101-382.100.

Groswith, Charles T., III; Seipp III, Edwin A.; and Myers, Thomas P., to Taurus Holdings, Inc. Book binding connector and binding-debinding tool. 4,893,836, Cl. 281-28.000.

Grozdanova, Ivanka S.: *See*—
Butchkov, Dimiter T.; Dragieva, Yovka D.; Nikolov, Zvetan K.; Georgiev, Georgi G.; Slavtcheva-Staikova, Mina S.; and Grozdanova, Ivanka S., 4,893,793, Cl. 266-233.000.

Grumman Aerospace Corporation: *See*—
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GSM Design: *See*—
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GTE Government Systems Corporation: *See*—
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GTE Products Corporation: *See*—
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Gtag & Cir. AG: *See*—
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Gualdoni, Glenn R.: *See*—
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Guba, Robert F.; and Leschanz, Karl, to Varian Associates, Inc. Size sensing x-ray cassette tray. 4,894,854, Cl. 378-181.000.

Guckenheimer, Peter U., to Hewlett-Packard Company. Solderless surface mount card edge connector. 4,894,022, Cl. 439-260.000.

Gudger, Keith H., to Atmel Corporation. Output macrocell for programmable logic device. 4,894,563, Cl. 307-465.000.

Gudmundsson, Edgar; and Asmundsson, Oli J. Relocatable vertical or horizontal wall system. 4,893,446, Cl. 52-238.100.

Guenthner, Richard A.: *See*—
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Guiler, Richard S., to E. J. Brooks Company. Padlock-type security seal. 4,893,853, Cl. 292-320.000.

Guinn, Perry W.; and Mills, Gary N., to C. D. Medical, Inc. Bioreactor system. 4,894,342, Cl. 435-291.000.

Guiver, Michael D.; Tremblay, Andre Y.; and Tam, Chung M., to National Research Council of Canada. Method of manufacturing a reverse osmosis membrane and the membrane so produced. 4,894,159, Cl. 210-500.410.

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Gunderson, Inc.: *See*—
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Gunnell, Inc.: *See*—
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Gupta, Chakra V., to Comm/Scope, Inc. High frequency signal cable with improved electrical dissipation factor and method of producing same. 4,894,488, Cl. 174-28.000.

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Guthrie, David W.; and Weber, Robert E., to Kimberly-Clark Corporation. Flexible, tear resistant composite sheet material and a method for producing the same. 4,894,280, Cl. 428-224.000.

Gutman, Edward J.: *See*—
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Guttinger, Peter: *See*—
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Hachmann, Hans-Jurgen; and Hoener, Siegfried, to Jungheinrich Unternehmensverwaltung KG, Firma. Safety arrangement for fork trucks. 4,893,693, Cl. 180-275.000.

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Hagenbach, Robert J., to Xerox Corporation. Carrier and developer compositions generated from fly ash particles. 4,894,305, Cl. 430-106.600.

Hager, Thomas H.: *See*—
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Hake, Lawrence W. Endoscope construction with means for controlling rigidity and curvature of flexible endoscope tube. 4,893,613, Cl. 128-4.000.

Haken, Roger A.: *See*—
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Hall, Harold E. Connector assembly for anode ring of cathode ray tube. 4,894,023, Cl. 439-278.000.

Halls, Kenneth F.; and Harrison, Donald W., to Halls, Kenneth F. Method for refinishing building panels. 4,894,102, Cl. 156-94.000.

Hamacher, John C.: *See*—
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Hamada, Tatsuro: *See*—
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Hamamsy, Mahmoud A. E.; Forrest, Stephen R.; and Zuber, John R., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Restricted contact, planar photodiode. 4,894,703, Cl. 357-30.000.

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Hamilton Standard Controls, Inc.: *See*—
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Hammer, Frank E.; Scott, Don; Wagner, Fred W.; Ray, Lee; and de la Motte, Rebecca S., to Suomen Sokeri Oy. Microbial sulfhydryl oxidase and method. 4,894,340, Cl. 435-189.000.

Hammer, Helmut, to Werner und Kolb Werkzeugmaschinen GmbH. Apparatus for changing tools of a numerically controlled machining center. 4,893,399, Cl. 29-568.000.

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Handline, Michael: *See*—
Lombardi, John J.; Handline, Michael; and Goode, Gary, 4,893,719, Cl. 220-1.00T.

Hani, Kiyoshi; Hayama, Mutsuko; Nishimoto, Yoshio; Hishiki, Hiroshi; Kimura, Minoru; and Nakai, Tatsushi, to Mitsubishi Denki Kabushiki Kaisha. Metal-core printed wiring board and a process for manufacture thereof. 4,894,271, Cl. 428-137.000.

Hanisch, Wolfgang H.: *See*—
Dorin, Glenn; Hanisch, Wolfgang H.; Thomson, James W.; Wolfe, Sidney N.; and Lin, Leo S., 4,894,439, Cl. 530-351.000.
Hanley, Matthew W.: *See*—
Colvin, Arthur E., Jr.; and Hanley, Matthew W., 4,894,152, Cl. 210-198.200.
Hansen, Anthony D., to United States of America, Energy. Aethalometer. 4,893,934, Cl. 356-434.000.
Hansen, Arne H. Safety wall and a safety cage for tire inflation. 4,893,569, Cl. 109-1.00S.
Hansen, Peter; Klages, Claus-Peter; Schmidt, Klaus-Peter; Tolksdorf, Wolfgang F. M.; and Witter, Klaus, to U.S. Philips Corp. Magneto-optical light switching element and method of manufacturing same. 4,893,909, Cl. 350-377.000.
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Hara, Makoto, to Fuji Photo Film Co., Ltd. Signal processing method for analyzing autoradiograph. 4,894,786, Cl. 364-497.000.
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Harris, Daniel J.; and Gladych, Richard W., to Harrow Products, Inc. Dual sensor electromagnetic door lock system. 4,893,852, Cl. 292-251.500.
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Hess, Robert A., to Stainless Steel Products, Inc. Bearing seal for universal ball joint. 4,893,847, Cl. 285-226.000.
Hessman, Anders B. I.; and Nystrom, Leif R., to Sandvik AB. Cutting insert and method for chip removing machining. 4,893,969, Cl. 407-114.000.
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Cham, Kit M.; and Voorde, Paul V., 4,894,694, Cl. 357-23.300.
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Tsung Pan, Alfred I., 4,894,664, Cl. 346-1.100.
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Hickman, Derek F.; and Boshier, Raymond H., to Racal Marine Electronics Limited. Pendulum vibration isolator and damper. 4,893,796, Cl. 261-136.000.
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Borden, Peter G.; and Munson, Jon, 4,894,529, Cl. 250-222.200.
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Hijikigawa, Masaya; Miyoshi, Shuji; and Akiyama, Hisashi, to Sharp Kabushiki Kaisha. Field effect pressure sensor. 4,894,698, Cl. 357-26.000.
Hilal, Mohamed A.; Parmer, Jerome F.; Peck, Scott D.; and Leung, Eddie M. W., to General Dynamics Corporation, Convair Division. Hybrid pulse power transformer. 4,894,556, Cl. 307-106.000.
Hilborn, David M.; and McGarry, Stephen P., to United Technologies Automotive Inc. Console mounted to a headliner. 4,893,867, Cl. 296-214.000.
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Hildebrandt, Eugene F.; and Ottersbach, Thomas V., to Emerson Electric Co. Apparatus for making electrical connections in a dynamoelectric machine. 4,894,571, Cl. 310-68.00C.
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Hill, Charles C.; Thomas Gareth R.; Kaleta, Gary S.; and Saxton, Gregory J., to Gunderson, Inc. Railroad freight car with well for stacked cargo containers. 4,893,567, Cl. 105-419.000.
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Hillyard, Carmel J.; Rylatt, Dennis B.; Kemp, Bruce E.; and Bundesen, Peter G., to Agen Limited. Erythrocyte agglutination assay. 4,894,347, Cl. 436-540.000.
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Himmelmann, Wolfgang; Sobel, Johannes; Ohlschlager, Hans; and Schranz, Karl-Wilhem, to Agfa-Gevaert Aktiengesellschaft. Hardeners for proteins, a layer of binder hardened therewith and a photographic recording material containing such a layer. 4,894,324, Cl. 430-622.000.
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Hines, William R., to General Electric Company. Emissions control for gas turbine engine. 4,893,468, Cl. 60-39.050.
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Hitachi Automotive Engineering Co., Ltd.: *See*—
Kubota, Masanori; Ueno, Sadayasu; Sato, Kanemasa; and Miura, Kiyoshi, 4,893,502, Cl. 73-118.100.

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Iwasaki, Kazuhiko; Funabashi, Tsuneo; Kawasaki, Ikuya; Inayoshi, Hideo; Hasegawa, Atsushi; Yaginuma, Takao; and Kondoh, Eiki, 4,894,768, Cl. 364-200.000.

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Iwasaki, Kazuhiko; Funabashi, Tsuneo; Kawasaki, Ikuya; Inayoshi, Hideo; Hasegawa, Atsushi; Yaginuma, Takao; and Kondoh, Eiki, 4,894,768, Cl. 364-200.000.
Kanamaru, Hisanobu; and Harada, Kouji, 4,894,045, Cl. 464-138.000.
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Nagase, Makoto; Asakura, Yamato; Karasawa, Hidetoshi; Sakagami, Masaharu; Uchida, Shunsuke; Sawa, Toshio; and Ohsumi, Katsumi, 4,894,202, Cl. 376-306.000.
Nakasuna, Seiko; Kawarai, Takeshi; Toyoshima, Shuji; Kobayashi, Hirotaka; and Nishiyama, Takanori, 4,894,731, Cl. 360-9.100.
Nemoto, Kiyomitsu; Yokota, Norikatsu; Sato, Yoshihiko; Shimoyashiki, Shigehiro; Mokuya, Kenji; and Haino, Hiroshi, 4,893,792, Cl. 266-227.000.
Otomo, Shigekazu; Kumasaka, Noriyuki; Imura, Ryo; Suzuki, Ryo; and Sugita, Yutaka, 4,894,098, Cl. 148-122.000.
Saito, Ryuichi; and Momma, Nachiro, 4,894,801, Cl. 365-154.000.
Sukeda, Hirofumi; Ojima, Masahiro; and Saito, Atsushi, 4,894,816, Cl. 369-54.000.
Sunagawa, Masao; Kubota, Kazuhiro; Ishii, Yoshitaro; and Satoh, Susumu, 4,893,376, Cl. 15-337.000.
Takahashi, Mikio; Moribe, Yoshihiro; Maekawa, Hideo; Abo, Takaaki; Yamamoto, Yasuo; Nakamura, Shigeo; and Beppu, Osamu, 4,894,735, Cl. 360-97.010.
Takahashi, Toshihiro; Tobita, Hideyuki; Ito, Koichi; and Nakano, Shigeharu, 4,893,484, Cl. 68-12.00R.
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Takeuchi, Seiji; Ebara, Katsuya; Kamo, Tomoichi; Iwamoto, Kazuo; Horiba, Tatsuo; Kumagai, Teruo; Tamura, Kouki; and Kitami, Kunko, 4,894,355, Cl. 502-101.000.
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Yamashita, Junichi, 4,894,200, Cl. 376-237.000.

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Iwasaki, Kazuhiko; Funabashi, Tsuneo; Kawasaki, Ikuya; Inayoshi, Hideo; Hasegawa, Atsushi; Yaginuma, Takao; and Kondoh, Eiki, 4,894,768, Cl. 364-200.000.

Hjulstrom, Richard A., to Electro-Films, Inc. Adjustment of thin film capacitors. 4,894,316, Cl. 430-316.000.

Hladilek, Richard J.: *See*—
Schramm, Gary L.; Pontillo, Ralph G.; and Hladilek, Richard J., 4,894,095, Cl. 134-2.000.

Ho, W. S. Winston; Stogryn, Eugene L.; and Sartori, Guido, to Exxon Research and Engineering Company. Absorbent composition containing severely-hindered amine mixture for the absorption of H_2S. 4,894,178, Cl. 252-189.000.

Ho, W. S. Winston: *See*—
Sartori, Guido; Ho, W. S. Winston; and Stogryn, Eugene L., 4,894,179, Cl. 252-189.000.

Hoch, Paul-Gerhard, to SKF GmbH. Device for bearing mounting mechanism. 4,893,948, Cl. 384-551.000.

Hodlewsky, William G.: *See*—
Schroeder, Roger H.; Hodlewsky, William G.; and Murphy, James F., 4,893,709, Cl. 198-852.000.

Hoechst Aktiengesellschaft: *See*—
Pelzer, Heinz, 4,894,448, Cl. 536-84.000.
Reul, Bernhard; and Petri, Walter, 4,894,232, Cl. 424-439.000.
Roscher, Gunter; Kleiner, Hans-Jerg; Ihl, Gabriele; and Leipe, Hermann, 4,894,470, Cl. 558-142.000.
Staendeke, Horst; and Krause, Werner, 4,894,469, Cl. 558-90.000.

Hoechst Celanese Corporation: *See*—
Lindley, Daniel D.; and Murphy, Carl D., 4,894,482, Cl. 568-319.000.
Scates, Mark O.; Torrence, G. P.; and Wood, Ronny G., 4,894,477, Cl. 562-519.000.

Hoechst-Roussel Pharmaceuticals, Inc.: *See*—
Davis, Larry; and Effland, Richard C., 4,894,461, Cl. 548-241.000.

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Hachmann, Hans-Jurgen; and Hoener, Siegfried, 4,893,693, Cl. 180-275.000.

Hoenig, Stephen M.: *See*—
Farah, Hani; Chou, Chai J.; and Hoenig, Stephen M., 4,894,423, Cl. 525-468.000.

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Aig, Edward R.; Coffey, John W.; Lovey, Allen J.; and Rosenberger, Michael, 4,894,480, Cl. 568-11.000.

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McIntyre, Donald R.; Hollahan, Paul J.; and Sawhill, James A., 4,893,808, Cl. 272-94.000.

Hollenbaugh, Robert A., Sr., to R & R Enterprises. Removable cargo bed liner. 4,893,862, Cl. 296-39.100.

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Hancock, Robert D.; Hollman, Kenneth F.; and Porter, Gene A., 4,893,914, Cl. 350-530.000.

Holloway, Thomas C.: *See*—
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Elbe, Hans-Ludwig; Holmwood, Graham; Regel, Erik; Buchel, Karl H.; Schaller, Klaus; and Plempel, Manfred, 4,894,382, Cl. 514-383.000.

Holss, Kurt, to Arthur Pfeiffer Vakuumtechnik Wetzlar GmbH. Multistage molecular pump. 4,893,985, Cl. 415-90.000.

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Dave, Dilip; Holt, Andrew; and McNiff, Timothy K., 4,894,189, Cl. 264-15.000.

Holtfreter, Richard P., to American Telephone and Telegraph Company. Fuse Apparatus. 4,894,633, Cl. 337-278.000.

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Nomura, Chieko, 4,893,668, Cl. 160-327.000.

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Honda, Keisuke, 4,894,578, Cl. 310-323.000.

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Hirasaka, Mitsuaki; Nokajima, Kunio; and Murata, Nagatoshi, 4,893,402, Cl. 29-771.000.
Honda, Kiyoshi; Itoh, Tsukasa; and Kojima, Takashi, 4,893,834, Cl. 280-751.000.
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Yanagawa, Nikio; Honda, Kenji; and Okumura, Hiroshi, 4,894,730, Cl. 358-473.000.

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Wenzel, Dennis J.; Winter, Dean C.; and Honeyager, Kevin S., 4,893,631, Cl. 128-672.000.

Honeywell, Inc.: *See—*
Aggers, John R.; and Roth, Roger R., 4,894,826, Cl. 370-85.100.
Davis, Randall L., 4,894,665, Cl. 346-1.100.
Hudson, Charles L., Jr., 4,894,800, Cl. 371-22.500.
Kitchen, Robert D., 4,894,530, Cl. 250-227.000.
Lenk, Ronald J., 4,894,567, Cl. 307-542.000.
Monie, Vijaykumar S.; Frankowski, Elaine N.; Larson, James A.; Metz, Stephen V.; Nasiruddin, Mohammed; Reed, Michael D.; Richardson, Rose Mae M.; Wilsey, Orvil E.; and Wood, William T., 4,894,829, Cl. 371-20.100.

Hool, Patrick H.; and Gualdoni, Glenn R., to Lucas Industries Public Limited Company. Reservoir-formed shoulder stop for makeup fluid valve actuation in pull-type master cylinder. 4,893,473, Cl. 60-589.000.

Hoornstra, John W.: *See—*
Gay, Dwight S.; and Hoornstra, John W., 4,893,827, Cl. 280-250.100.

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Neiheisel, Gary L.; Bagdal, Karl T.; Hoover, Bradley R.; and Jacks, Robert H., 4,893,933, Cl. 356-376.000.

Hoptner, Wolfgang: *See—*
Gross, Helmut; Hoptner, Wolfgang; and Kaiser, Gunther, 4,893,602, Cl. 123-492.000.

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Shirahata, Isao; Shiga, Shoji; Hori, Hisako; and Jinbo, Takamasa, 4,893,404, Cl. 29-852.000.

Hori, Ryoichi: *See—*
Takeda, Eiji; Itoh, Kiyoo; Hori, Ryoichi; Shimohigashi, Katsuhiro; and Kimura, Katsutaka, 4,894,696, Cl. 357-23.600.

Horiba, Tatsuo: *See—*
Takeuchi, Seiji; Ehara, Katsuya; Kamo, Tomoichi; Iwamoto, Kazuo; Horiba, Tatsuo; Kumagai, Teruo; Tamura, Kouki; and Kitami, Kunko, 4,894,355, Cl. 502-101.000.

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Hormann, Michael, 4,893,666, Cl. 160-229.100.

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Horsch, Rudolf; and Frisbee, Claude M., to J. I. Case Company. Dozer blade mounting assembly. 4,893,683, Cl. 172-821.000.

Horst, Jurgen: *See—*
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Horvath, Eduard, to Otto Bock Orthopadische Industrie Besitz - und Verwaltungs - KG. Control valve. 4,893,648, Cl. 137-504.000.

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Albrecht, Peter; Balkau, Karl-Heinz; Cujic, Vinco; Doring, Tilman; Horwege, Claus; Reymann, Wolfgang; Vogel, Klaus; and Wiedenfeld, Walter, 4,894,198, Cl. 264-521.000.

Hosaka, Masao: *See—*
Negishi, Hirokazu; and Hosaka, Masao, 4,894,777, Cl. 364-419.000.

Hoshino, Kazuya: *See—*
Yoshitome, Eiji; Hoshino, Kazuya; and Kosugi, Susumu, 4,894,616, Cl. 324-309.000.

Hosoda, Kenichiro: *See—*
Miyamoto, Ryoichi; Itoh, Yoshio; Nakano, Yoshikazu; Tsujikado, Mitsuo; and Hosoda, Kenichiro, 4,894,820, Cl. 370-32.100.

Hosoi, Yuichi: *See—*
Takahashi, Kenji; Nakamura, Takashi; and Hosoi, Yuichi, 4,894,548, Cl. 250-484.100.

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Oguri, Masanori, 4,894,517, Cl. 219-388.000.

Houck, Richard T.; and Solanki, J. J., to Mobil Oil Corporation. VSP-based method and apparatus for tieing seismic data shot using different types of seismic sources. 4,893,694, Cl. 181-111.000.

Houston, L. L.: *See—*
Stevens, Paul; Houston, L. L.; Koths, Kirston E.; and Isell, Brian, 4,894,227, Cl. 424-85.200.

Howard, Paul: *See—*
Elko, Gary W.; Howard, Paul; and Quinlan, Daniel A., 4,894,749, Cl. 361-383.000.

Howard, William A., to Delta Systems, Inc. Torsion spring shorting connector. 4,894,019, Cl. 439-188.000.

Howes, Randolph M. Flow enhanced multi-lumen venous catheter device. 4,894,057, Cl. 604-280.000.

Hsia, Steve K.; and Pang, Chan-Sui, to Catalyst Semiconductor, Inc. Nonvolatile memory cell for eeprom including a floating gate to drain tunnel area positioned away from the channel region to prevent trapping of electrons in the gate oxide during cell erase. 4,894,802, Cl. 365-185.000.

Huang, Joseph: *See—*
Shyu, Jia Ming; Wen, Kuang Pu; and Huang, Joseph, 4,893,506, Cl. 73-171.000.

Huber, Ernst, to GRETAG Aktiengesellschaft. Cable conduit apparatus. 4,893,786, Cl. 254-414.000.

Huberty, John P.: *See—*
Engelstad, Barry L.; White, David L.; and Huberty, John P., 4,894,218, Cl. 424-1.100.

Hucke, Edward E., to Union Oil Company of California. Densified carbonaceous bodies. 4,894,287, Cl. 428-408.000.

Huckenbeck, Claus O., to Bausch & Lomb Incorporated. Adjustable control mechanism for optical instruments. 4,893,899, Cl. 350-255.000.

Hudson, Charles L., Jr., to Honeywell, Inc. Reconfigurable register bit-slice for self-test. 4,894,800, Cl. 371-22.500.

Huels Aktiengesellschaft: *See—*
Hellermann, Walter; Nordsiek, Karl-Heinz; and Wolpers, Jurgen, 4,894,425, Cl. 526-181.000.

Huether, Werner; Betz, Wolfgang; and Andrees, Gerhard, to MTU-Motoren-und Turbinen-Union Munchen GmbH. Method of producing dispersion hardened metal alloys. 4,894,086, Cl. 75-0.50A.

Huff, Harold E. Hanging wall table for swimming pools. 4,893,363, Cl. 4-496.000.

Hufstader, Gibson O., to General Motors Corporation. Electric motor-driven impeller-type air pump. 4,893,995, Cl. 417-370.000.

Hughes Aircraft Company: *See—*
Bullock, Peter W., 4,893,742, Cl. 228-110.000.
Catsiff, Ephraim H.; and Elias, William E., 4,894,413, Cl. 525-65.000.
Chang, David B., 4,894,623, Cl. 331-96.000.
Efron, Uzi; and Owechko, Yuri, 4,893,905, Cl. 350-338.000.
Frankenbach, David C., 4,894,653, Cl. 340-703.000.
Glenn, Gregory S.; and Montjar, William O., 4,894,508, Cl. 219-110.000.
Robusto, Paul F.; Scofield, David D.; Wang, Chan H.; and Hamacher, John C., 4,893,900, Cl. 350-320.000.
Welkowsky, Murray S., 4,894,724, Cl. 358-231.000.

Hughes, David L.: *See—*
Grabowski, Edward J. J.; and Hughes, David L., 4,894,450, Cl. 540-350.000.

Hughes Enterprises: *See—*
Hughes, Robert K., 4,893,455, Cl. 56-1.000.

Hughes, John T., to Micropore International Limited. Fire-resistant container and method of assembling same. 4,893,397, Cl. 29-428.000.

Hughes, Robert K., to Hughes Enterprises. Bendable marker and method of marking. 4,893,455, Cl. 56-1.000.

Huhmann, Virgil P.: *See—*
Stricker, David K.; Kuhn, John B.; Huhmann, Virgil P.; and Chase, William E., 4,893,392, Cl. 29-161.000.

Huling, Don W., to Boeing Company, The. Inlet air demoisturizing system for a cryogenic engine and method for operation thereof. 4,893,471, Cl. 60-204.000.

Hung, Chan C., to Acer Incorporated. Method and system for testing video. 4,894,718, Cl. 358-139.000.

Huntington Mechanical Laboratories, Inc.: *See—*
Balter, Valentin, 4,893,980, Cl. 414-3.000.

Hupe, Bernd; and Walter, Robert, to Kali-Chemie Aktiengesellschaft. Process for adjusting the structural and/or surface character of oxides. 4,894,357, Cl. 502-233.000.

Hurko, Bohdan, to Kanthal Corporation, The. Hot plate for cooking. 4,894,515, Cl. 219-345.000.

Hurley, Robert E. Spinning machine rotor shaft disk. 4,893,947, Cl. 384-549.000.

Hurst, James A., to Imperial Chemical Industries PLC. Leak detector. 4,894,539, Cl. 250-303.000.

Husqvarna Aktiebolag: *See—*
Rerdahl, Karl I. F., 4,893,575, Cl. 112-465.000.

Hutcheson, Jack D.: *See—*
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Huth, Andreas: *See—*
Seidelmann, Dieter; Schmiechen, Ralph; Huth, Andreas; Raltz, Dieter; Braestrup, Claus T.; and Engelstoft, Mogens, 4,894,377, Cl. 514-292.000.

Hwang, Jyh-Ping; Lin, Wen-Tai; Milkovic, Miran; and Noujaim, Sharbel E., to General Electric Company. Self-calibrating pipelined subranging analog-to-digital converter. 4,894,656, Cl. 341-120.000.

Hwang, Jyh-Ping; and Milkovic, Miran, to General Electric Company. Pipelined analog-to-digital architecture with parallel-autozero analog signal processing. 4,894,657, Cl. 341-158.000.

Hypres, Incorporated: *See—*
Drake, Robert E.; Faris, Sadeg M.; Patt, Roy M.; and Shen, Zhi-Yuan, 4,894,612, Cl. 324-158.00P.

Iannelli, Ronald F.: *See—*
Kruck, Richard W.; Iannelli, Ronald F.; and Laundroche, Kevin S., 4,893,478, Cl. 62-126.000.

Ibarrola, Jesus E., to Azkoyen Industrial, S.A. Mechanism for the reception and collection of coins in coin-operated machines. 4,893,706, Cl. 194-346.000.

Ibok, Effiong E., to Advanced Micro Devices, Inc. Method of fabricating passivated tunnel oxide. 4,894,353, Cl. 437-239.000.

Iceco S.P.A.: *See—*
Catalano, Cosimo; and Pasto', Paolo, 4,893,441, Cl. 52-126.600.

Ichikawa, Fumihiko; Takada, Hajime; and Asano, Kazuya, to Kawasaki Steel Corporation. Method of measuring distribution of crystal grains in metal sheet and apparatus therefor. 4,893,510, Cl. 73-620.000.

Ichikawa, Mitsuo: *See—*
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ICI Americas Inc.: *See—*
Baker, Don R.; and Brownell, Keith H., 4,894,379, Cl. 514-332.000.

Brown, Frederick J.; and Matassa, Victor G., 4,894,386, Cl. 514-414.000.

ICI Pharma: *See*—
Jung, Frederic H., 4,894,371, Cl. 514-202.000.

Iggulden, Jerry R.; and Streck, Donald A., to Iggulden, Jerry R.; and Streck, Donald A., a part interest to each. Selectable mixing bottle. 4,893,729, Cl. 222-42.000.

Ihama, Mikio: *See*—
Kawai, Kiyoshi; and Ihama, Mikio, 4,894,323, Cl. 430-569.000.

Ihl, Gabriele: *See*—
Roscher, Gunter; Kleiner, Hans-Jerg; Ihl, Gabriele; and Leipe, Hermann, 4,894,470, Cl. 558-142.000.

Iigo, Masaaki: *See*—
De Clercq, Erik; and Iigo, Masaaki, 4,894,365, Cl. 514-50.000.

Iijima, Kenzaburou; Takamura, Masayuki; and Sata, Takeo, to Yamaha Corporation. Rare earth type magnet and a method for producing the same. 4,894,097, Cl. 148-101.000.

Ikeda Bussan Co., Ltd.: *See*—
Iwamoto, Hiroaki; and Kogure, Masaaki, 4,893,873, Cl. 297-452.000.

Ikeda, Tadashi; Ogawa, Tadashi; and Okazaki, Masaki, to Fuji Photo Film Co., Ltd. Color image-forming process for high silver chloride color photographic material having improved spectral sensitivity and silver removability. 4,894,319, Cl. 430-383.000.

Ikegaya, Ken-ichi: *See*—
Nakanishi, Akio; Ikegaya, Ken-ichi; and Naitoh, Takao, 4,894,856, Cl. 379-61.000.

Ikemoto, Yutaka; and Yamashita, Akiyoshi, to Sharp Kabushiki Kaisha. Calorie calculator with menu retrieval function. 4,894,793, Cl. 364-709.030.

Illinois Tool Works Inc.: *See*—
Frano, Francis G., 4,893,978, Cl. 411-553.000.

Im, Yoon: *See*—
Jang, Choong-Gook; and Im, Yoon, 4,894,236, Cl. 424-470.000.

Imhof, Martin, to W. Hermann AG. Endoprosthesis for a hip-joint socket. 4,894,064, Cl. 623-22.000.

Immonen, Toivo. Impotence support. 4,893,616, Cl. 128-79.000.

Immunex Corporation: *See*—
Cerretti, Douglas P.; Maliszewski, Charles R.; and Schoenborn, Michael A., 4,894,333, Cl. 435-69.520.

Imperial Chemical Industries plc: *See*—
Denny, Patrick J.; Thomas, Alan E.; and Carnell, Peter J., 4,894,210, Cl. 423-230.000.
Gordon, Paul F.; and Bothwell, Brian, 4,894,186, Cl. 252-582.000.
Hurst, James A., 4,894,539, Cl. 250-303.000.
Richardson, Kenneth R., 4,894,341, Cl. 435-227.000.

IMS Iosen Mikrofabrikations Systeme Gesellschaft m.b.H.: *See*—
Stengl, Gerhard, 4,894,549, Cl. 250-492.200.

Imura, Ryo: *See*—
Otoeno, Shigekazu; Kumasaka, Noriyuki; Imura, Ryo; Suzuki, Ryo; and Sugita, Yutaka, 4,894,098, Cl. 148-122.000.

Imuta, Junichi: *See*—
Tan, Hiroaki; Kato, Koji; Imuta, Junichi; and Kihara, Noriaki, 4,894,475, Cl. 560-251.000.

Ina, Katsuhiro: *See*—
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Inayoshi, Hideo: *See*—
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Indupack AG: *See*—
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Industrial Technology Research Institute: *See*—
Shyu, Jia Ming; Wen, Kuang Pu; and Huang, Joseph, 4,893,506, Cl. 73-171.000.

Ingersoll-Rand Company: *See*—
Capp, F. William; Gerhardt, Don J.; and Little, Randal A., 4,894,193, Cl. 264-104.000.
Luthi, Oscar; Lewis, Frederick S.; and Carlsmith, Lawrence A., 4,894,121, Cl. 162-329.000.
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Ingram, Charles B.: *See*—
Gillett, Jimmie D.; Garcia, Richard R.; and Ingram, Charles B., 4,893,479, Cl. 62-213.000.

Ink Company, The: *See*—
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Inoue, Koji: *See*—
Akao, Mutsuo; Inoue, Koji; and Osansi, Hiroyuki, 4,894,264, Cl. 428-34.200.

Inoue, Satomi: *See*—
Ueno, Ryuzo; Katsura, Shinichi; Uchiyama, Yoshirou; and Inoue, Satomi, 4,894,359, Cl. 503-209.000.

Inoue, Yoshiyuki: *See*—
Yamanouchi, Shosuke; Inoue, Yoshiyuki; and Kondo, Masaaki, 4,894,284, Cl. 428-378.000.

Inovelf: *See*—
Cornut, Bruno, 4,894,204, Cl. 422-72.000.

Instance, David J. Method for manufacture of labels. 4,894,106, Cl. 156-227.000.

Institut Francais du Petrole: *See*—
Arnaudeau, Marcel, 4,894,069, Cl. 55-89.000.

Instituto Mexicano de Investigaciones Siderurgicas: *See*—
Lazcano-Navarro, Arturo; and Geronimo-Torres, Andres, 4,894,122, Cl. 201-17.000.

Interchain N.V.: *See*—
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Interlego AG.: *See*—
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Intermedics Orthopedics, Inc.: *See*—
Dale, James L.; Burkinshaw, Brian D.; and Burkhead, Wayne Z., 4,893,619, Cl. 606-87.000.

International Business Machines Corporation: *See*—
Cavaliere, Joseph R.; and Smith, George E., III, 4,894,562, Cl. 307-455.000.
Chalco, Pedro A.; and Andreshak, Joseph C., 4,894,509, Cl. 219-121.600.
Chhabra, Devendra S.; Le Van, Dien; and Nishihira, Henry S., 4,894,740, Cl. 360-103.000.
Chin, Daeje; and Dhong, Sang H., 4,894,697, Cl. 357-23.600.
Doyle, Marguerite H.; Early, Roger W.; Myers, Steven R.; Ringle, Terrence W.; and Smith, David R., 4,894,798, Cl. 364-900.000.
Ottesen, Hjalmar H.; Nakagawa, Yuzo; and Ono, Shyunji, 4,894,599, Cl. 318-636.000.
Ryman, Arthur G., 4,894,646, Cl. 340-747.000.
Sachdev, Krishna G.; Pennington, Keith S.; and Cohen, Mitchell S., 4,894,279, Cl. 428-216.000.

International Precision Components Corporation: *See*—
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International Telesystems Corporation: *See*—
Ramsay, John; Quellette, Thomas; and Deglin, Richard N., 4,894,827, Cl. 371-8.200.

Intevep, S.A.: *See*—
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Inuentions Inc.: *See*—
Szlam, Aleksander; Crooks, James W., Jr.; Marks, Curtis G.; and Warner, Charles L., II, 4,894,857, Cl. 379-67.000.

Inui, Toshiharu: *See*—
Ishikawa, Noriyoshi; Harada, Toshiaki; Inui, Toshiharu; Yamamoto, Tadashi; Nakajima, Kazuhiro; and Takenouchi, Masanori, 4,894,666, Cl. 346-76.0PH.

Inukai, Masahiro; and Matsuoka, Hiroshi, to Bando Chemical Industries, Ltd. V belt with blocks. 4,894,048, Cl. 474-240.000.

Iowa State University Research Foundation, Inc.: *See*—
Conzemius, Robert J., 4,894,536, Cl. 250-287.000.

Ishida, Syuichi; Goto, Shinichi; and Muramatsu, Kimio, to Toyoda Gosei Co., Ltd. Steering wheel. 4,893,521, Cl. 74-552.000.

Ishiguro, Toshiaki: *See*—
Furusawa, Choji; Shimei, Masato; Ishiguro, Toshiaki; Hattori, Katsuhiko; and Yamaguchi, Hiroyuki, 4,893,527, Cl. 74-866.000.

Ishii, Tatsuya; Okumura, Yoshinori; and Nagatomo, Masao, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor device with no stress generated at the trench corner portion and the method for making the same. 4,894,695, Cl. 357-23.600.

Ishii, Yoshitaro: *See*—
Sunagawa, Masao; Kubota, Kazuhiro; Ishii, Yoshitaro; and Satoh, Susumu, 4,893,376, Cl. 15-337.000.

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Takahashi, Takeshi; Nakamura, Masatake; Yabana, Yoshiji; Ishikawa, Toshiyuki; and Nagata, Koji, 4,894,489, Cl. 174-35.0MS.

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Stevens, Paul; Houston, L. L.; Koths, Kirston E.; and Issell, Brian, 4,894,227, Cl. 424-85.200.

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Valcavi, Umberto; Innocenti, Sergio; Bosone, Enrico; Farina, Paolo; Marotta, Vittorio; and Zabban, Gianbattista, 4,894,473, Cl. 560-156.000.

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Menicagli, Claudio, 4,894,441, Cl. 530-356.000.

Itakura, Ryoichi, to Jamco Corporation. Catch unit for a latch device. 4,893,855, Cl. 292-341.170.

Ito, Katsunori: *See*—
Sato, Yoshihisa; Akiyama, Susumu; Hirabayashi, Yuji; Ina, Katsuhiro; Ito, Katsunori; Saito, Takao; and Tanigawa, Tetsuo, 4,894,781, Cl. 364-431.110.

Ito, Koichi: *See*—
Takahashi, Toshihiro; Tobita, Hideyuki; Ito, Koichi; and Nakano, Shigeharu, 4,893,484, Cl. 68-12.00R.
Ito, Masaaki: *See*—
Watanabe, Yutaka; Kusano, Hideaki; and Ito, Masaaki, 4,894,681, Cl. 355-45.000.
Itoh, Kiyoo: *See*—
Takeda, Eiji; Itoh, Kiyoo; Hori, Ryoichi; Shimohigashi, Katsuhiro; and Kimura, Katsutaka, 4,894,696, Cl. 357-23.600.
Itoh, Manabu: *See*—
Sugiyama, Makoto; Ezure, Yoji; Ojima, Nobutoshi; Konno, Kiyotaka; Seto, Takashi; Nakamura, Teruya; and Itoh, Manabu, 4,894,344, Cl. 435-899.000.
Itoh, Seiga: *See*—
Yamaguchi, Kazuo; Saito, Akiko; Sekine, Susumu; Sato, Moriyuki; Itoh, Seiga; Shirahata, Kunikatsu; Hirano, Tetsuya; and Kawauchi, Hiroshi, 4,894,362, Cl. 514-12.000.
Itoh, Tsukasa: *See*—
Honda, Kiyoshi; Itoh, Tsukasa; and Kojima, Takashi, 4,893,834, Cl. 280-751.000.
Itoh, Yoshio: *See*—
Miyamoto, Ryoichi; Itoh, Yoshio; Nakano, Yoshikazu; Tsujikado, Mitsuo; and Hosoda, Kenichiro, 4,894,820, Cl. 370-32.100.
Itoki Co., Ltd.: *See*—
Tsuchida, Shigeki; Sumi, Sabarou; and Nakagawa, Motohiro, 4,893,884, Cl. 312-107.000.
Itoki Kosakusho Co., Ltd.: *See*—
Tsuchida, Shigeki; Sumi, Sabarou; and Nakagawa, Motohiro, 4,893,884, Cl. 312-107.000.
ITW-ATECO, GmbH: *See*—
Gramss, Rainer, 4,893,700, Cl. 188-306.000.
Iwahashi, Yuji: *See*—
Yamashina, Shuichi; Yahagi, Minoru; and Iwahashi, Yuji, 4,893,766, Cl. 242-198.000.
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Watanabe, Takahiro; Matsumoto, Isao; Suga, Masakazu; and Iwai, Toshimitsu, 4,893,971, Cl. 409-80.000.
Iwakiri, Toyokazu; Sugiyama, Akira; Kashima, Yoshio; Betsui, Ikuo; and Suzuki, Nobuo, to Seiko Instruments Inc. Optical attenuator. 4,893,889, Cl. 350-96.150.
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Iwamoto, Kazuo: *See*—
Takeuchi, Seiji; Ebara, Katsuya; Kamo, Tomoichi; Iwamoto, Kazuo; Horiba, Tatsuo; Kumagai, Teruo; Tamura, Kouki; and Kitami, Kunko, 4,894,355, Cl. 502-101.000.
Iwasaki, Kazuhiko; Funabashi, Tsuneo; Kawasaki, Ikuya; Inayoshi, Hideo; Hasegawa, Atsushi; Yaginuma, Takao; and Kondoh, Eiki, to Hitachi, Ltd.; Hitachi Microcomputer Engineering, Ltd.; and Hitachi Engineering Co., Ltd. Data processing system with coprocessor. 4,894,768, Cl. 364-200.000.
Iwatani, Mitsuo; Takano, Hiroaki; and Mikuriya, Masatoshi, to Sony Corporation. Ink ribbon positioning system for color printing apparatus. 4,893,951, Cl. 400-225.000.
Iwatsuki, Masashi; Ohi, Kimio; Suzuki, Kazuma; and Miyashita, Kiyoshi, to Jeol Ltd. Scanning device for scanning tunneling microscope. 4,894,538, Cl. 250-306.000.
Izzo, Peter G.: *See*—
Hediger, Edwin A.; Kenin, Michael; and Izzo, Peter G., 4,893,740, Cl. 226-23.000.
J. I. Case Company: *See*—
Horsch, Rudolf; and Frisbee, Claude M., 4,893,683, Cl. 172-821.000.
J. M. Voith GmbH: *See*—
Heinzmann, Helmut, 4,893,741, Cl. 226-196.000.
Kuhn, Friedrich, 4,893,762, Cl. 242-56.00R.
Jacks, Robert H.: *See*—
Neiheisel, Gary L.; Bagdal, Karl T.; Hoover, Bradley R.; and Jacks, Robert H., 4,893,933, Cl. 356-376.000.
Jackson, Lucinda A.: *See*—
Pews, R. Garth; Jackson, Lucinda A.; and Carson, Chrislyn M., 4,894,085, Cl. 71-105.000.
Jacobs, Martinez J.; and Rutten, Hendrickus J. J., to Dyneema V.O.F. Apparatus for the surface treatment of synthetic fibers or yarns. 4,894,131, Cl. 204-165.000.
Jacques, Serge; and Boulanger, Roger. Mechanically powered crimping tool. 4,893,493, Cl. 72-325.000.
Jacquier, Paul: *See*—
Isnardon, Gerald; Jacquier, Paul; and Voisembert, Lylvie, 4,893,490, Cl. 72-53.000.
Jaffa, David, to Artwave America, Inc. Stretcher means for use in a spin art machine. 4,893,583, Cl. 118-52.000.
Jagger, Brian E.: *See*—
Ragen, Robert A.; Gabor, Andrew; Weller, Ivor; Frankhuizen, Michiel; and Jagger, Brian E., 4,893,950, Cl. 400-185.000.
Jakopp, Thomas: *See*—
Cournoyer, Richard; Jakopp, Thomas; and Friberg, G. E., 4,894,162, Cl. 210-603.000.
Jamco Corporation: *See*—
Itakura, Ryoichi, 4,893,855, Cl. 292-341.170.
James River Corporation of Virginia: *See*—
Schubring, H. Herbert, 4,894,306, Cl. 430-126.000.
Jan, Boo Lin. Diversified bookrest. 4,894,756, Cl. 362-97.000.
Jang, Choong-Gook; and Im, Yoon, to Jang, Choong-Gook. Direct compression tablet binders for acetaminophen. 4,894,236, Cl. 424-470.000.
Janiel, Peter A.: *See*—
Gartner, Georg F.; and Janiel, Peter A., 4,894,256, Cl. 427-39.000.
Janik, Marian: *See*—
Miller, Charles D.; Janik, Marian; and Tomoyasu, Richard S., 4,893,474, Cl. 60-602.000.
Janney, Mark A., to Martin Marietta Energy Systems, Inc. Method for molding ceramic powders. 4,894,194, Cl. 264-109.000.
Janson, David A., to Eaton Corporation. Controlled compliance for rear wheel steering. 4,893,825, Cl. 280-81.600.
Janssen, Gerardus J. M.; and Verlijsdonk, Antonius P., to U.S. Philips Corporation. Receiver for a phase-shift keyed carrier signal. 4,894,845, Cl. 375-83.000.
Japan Synthetic Rubber Co., Ltd.: *See*—
Shimada, Noboru; Hattori, Iwakazu; Sakakibara, Mitsuhiko; Oshima, Noboru; Hamada, Tatsuro; Fukuoka, Hiromi; and Fujimaki, Tatsuo, 4,894,409, Cl. 524-492.000.
Jarosz, John M.: *See*—
Fendley, James R.; and Jarosz, John M., 4,894,037, Cl. 445-30.000.
Javan, Ali, to Laser Science, Inc. Doppler laser radar system. 4,893,923, Cl. 358-28.500.
Jekerle, Jiri; and Hein, Jean-Claude, to Schmidt'sche Heissdampf GmbH. Adaptive control technique for steam generator cleaning. 4,893,588, Cl. 122-379.000.
Jen, Cheng K.; and Farnell, Gerald W., to Canadian Patents & Development Ltd. Ultrasonic imaging system using bundle of acoustic waveguides. 4,894,806, Cl. 367-7.000.
Jennings, Charles E.: *See*—
Brammer, Norman; and Jennings, Charles E., 4,893,677, Cl. 166-341.000.
Jennings, J. T., to Container Mfg. Inc. Exact volume dispensing container. 4,893,732, Cl. 222-109.000.
Jennings, Kenneth L.: *See*—
Jennings, Paul D.; and Jennings, Kenneth L., 4,893,728, Cl. 221-306.000.
Jennings, Michael D., to Mastercraft Boat Co. Tow rope pylon with rotatable bushing. 4,893,577, Cl. 114-253.000.
Jennings, Paul D.; and Jennings, Kenneth L. Article dispenser. 4,893,728, Cl. 221-306.000.
Jennings, Robert H.: *See*—
Beasley, Jerry W.; and Jennings, Robert H., 4,894,640, Cl. 340-464.000.
Jensen, Bruce A., to Applied Automation, Inc. Automatic control of feedstock vacuum towers. 4,894,145, Cl. 208-350.000.
Jensen, Dennis P.: *See*—
Morgan, Lee W.; Esser, Richard J.; and Jensen, Dennis P., 4,894,397, Cl. 523-201.000.
Jensen General Corp.: *See*—
Aisley, William J., 4,894,272, Cl. 428-156.000.
Jensen, Jay E., to Mobil Oil Corporation. Method and apparatus for detecting liquid leaks. 4,893,498, Cl. 73-49.200.
Jensen, Ole R., to E. R. Squibb & Sons, Inc. Adhesive connecting rings for an ostomy device. 4,894,058, Cl. 604-332.000.
Jeol Ltd.: *See*—
Iwatsuki, Masashi; Ohi, Kimio; Suzuki, Kazuma; and Miyashita, Kiyoshi, 4,894,538, Cl. 250-306.000.
Ono, Akishige, 4,894,541, Cl. 250-310.000.
Jericho, Manfred H.: *See*—
Blackford, Bradford L.; Dahn, Douglas C.; and Jericho, Manfred H., 4,894,537, Cl. 250-306.000.
Jiang, Ching-Lin; and Podkowa, William J., to Dallas Semiconductor Corporation. Delay circuit for a monolithic integrated circuit and method for adjusting delay of same. 4,894,791, Cl. 364-570.000.
Jinbo, Takamasa: *See*—
Shirahata, Isao; Shiga, Shoji; Hori, Hisako; and Jinbo, Takamasa, 4,893,404, Cl. 29-852.000.
Joel, Darrel D.: *See*—
Kehayias, Joseph J.; Joel, Darrel D.; Adams, William H.; and Stein, Harry L., 4,893,627, Cl. 128-654.000.
Joguet, Jean C.; and Schilliger, Michel, to LMT Radioprofessionnelle. Landing assistance system using navigation satellites. 4,894,655, Cl. 340-988.000.
Johnson, Bertram C.: *See*—
DiFonzo, John C.; and Johnson, Bertram C., 4,894,837, Cl. 372-72.000.
Johnson, Bryan, to Spontex Incorporated. Hand-held utensil for surface cleaning, mopping and the like. 4,893,369, Cl. 15-119.00A.
Johnson, Eric: *See*—
Middelhoven, Paul J.; Albertson, Mark J.; and Johnson, Eric, 4,893,879, Cl. 303-71.000.
Johnson, James S., to Micron Separations, Inc. Process for producing supported cellulosic membranes and products. 4,894,157, Cl. 210-490.000.
Johnson, Todd W. Locking device for boat motor. 4,893,487, Cl. 70-58.000.
Johnson, Wade M., Jr.: *See*—
Marsden, Michael J.; and Johnson, Wade M., Jr., 4,893,505, Cl. 73-155.000.
Johnson, William B. Appliance for use in applying filler material to an endodontically prepared root canal. 4,894,011, Cl. 433-81.000.
Jones, Gregory H. Compartmented waste receptacle. 4,893,722, Cl. 220-1.00T.
Jones, Larry J.: *See*—
Weder, Donald E.; Weder, E. H.; Ruth, Howard M.; King, Michael J.; Craig, Franklin J.; Jones, Larry J.; Badgley, Kenton D.; Snider, Harry J., deceased; Dye, S. Owen; Wiedner, Clay R.;

Weder, Bill C.; Langenberg, Robert L.; and Snider, Laura L., 4,893,757, Cl. 241-34.000.
Jordan, Peter A. System for offshore operations. 4,893,965, Cl. 405-202.000.
Jordan, Raymond M.: *See*—
Munoz, Jose P.; and Jordan, Raymond M., 4,893,753, Cl. 239-578.000.
Joseph, Alan W., Jr.; and Joseph, Timothy E. Scuba whistle. 4,893,580, Cl. 116-137.00R.
Joseph, Timothy E.: *See*—
Joseph, Alan W., Jr.; and Joseph, Timothy E., 4,893,580, Cl. 116-137.00R.
Joshi, Shrikant M.; Whitehead, Lee C.; and Oddi, Frederick V., to General Motors Corporation. Integral radiator hose and oil cooler. 4,893,670, Cl. 165-40.000.
Juda, Robert H.: *See*—
Chakrabarti, Paritosh M.; Crawford, Roger A.; and Juda, Robert H., 4,894,241, Cl. 424-672.000.
Juhlke, Timothy J.: *See*—
Lagow, Richard J.; Bierschenk, Thomas R.; Juhlke, Timothy J.; and Kawa, Hajimu M., 4,894,484, Cl. 568-615.000.
Jujo, Yozo: *See*—
Mizuno, Kenichi; Jujo, Yozo; and Oyoshi, Hajime, 4,894,432, Cl. 528-204.000.
Jukkala, Esko H., to Mikrovalmiste U.J. Pulkkanen Oy. Method and a device for measuring a distance by means of ultrasonic pulses. 4,894,810, Cl. 367-118.000.
Jung, Frederic H., to ICI Pharma. 3-substituted-aminomethyl cephalosporin derivatives. 4,894,371, Cl. 514-202.000.
Jungheinrich Unternehmensverwaltung KG, Firma: *See*—
Hachmann, Hans-Jurgen; and Hoener, Siegfried, 4,893,693, Cl. 180-275.000.
Jungreis, Aaron; Capewell, Dennis; and Luchaco, David G., to Lutron Electronics Co., Inc. High frequency gas discharge lamp dimming ballast. 4,894,587, Cl. 315-200.00R.
Junkosha Co., Ltd.: *See*—
Sugibuchi, Hiroyuki; and Akiba, Juji, 4,894,636, Cl. 338-9.000.
Juntunen, Timothy J., to Minnesota Mining and Manufacturing Company. Component reel. 4,893,764, Cl. 242-71.900.
Justice, Donald R. Adjustable king-sized mattress. 4,893,365, Cl. 5-68.000.
Kaatz, Thomas: *See*—
Fetcenko, Michael A.; Kaatz, Thomas; Sumner, Steven P.; and LaRocca, Joseph, 4,893,756, Cl. 241-33.000.
Kaba, Toshiaki: *See*—
Yamazaki, Atsuo; Kaba, Toshiaki; and Sakaguchi, Kenji, 4,894,500, Cl. 200-565.000.
Kabelmetal Electro GmbH: *See*—
Ziemek, Gerhard; Staschewski, Harry; and Procher, Klaus, 4,893,892, Cl. 350-96.220.
Kabushiki Kaisha Dymosha: *See*—
Kubo, Setsuo, 4,893,607, Cl. 125-21.000.
Kabushiki Kaisha Fulltime System: *See*—
Komei, Yutaka, 4,894,717, Cl. 358-108.000.
Kabushiki Kaisha Kobe Seiko Sho: *See*—
Yamaguchi, Yoshihiro; Murata, Hiroyuki; Mizukami, Shunichi; Ohuchi, Kenichiro; Morimoto, Hiroyuki; and Hirose, Jun, 4,894,088, Cl. 75-232.000.
Kabushiki Kaisha Komatsu Seisakusho: *See*—
Yoshinada, Hiroshi; and Takeda, Shu, 4,893,981, Cl. 414-5.000.
Kabushiki Kaisha Toshiba: *See*—
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Komatsu, Fumio, 4,894,540, Cl. 250-307.000.
Kondo, Toshinori; and Okikawa, Takao, 4,894,819, Cl. 376-4.000.
Nogami, Kazutaka, 4,894,561, Cl. 307-443.000.
Saito, Yoshihiko; and Matsushita, Yoshiaki, 4,894,349, Cl. 437-95.000.
Uchida, Makoto, 4,893,515, Cl. 73-864.340.
Yamashita, Youji; Kojima, Masakatu; Matsushita, Yoshiaki; and Ogino, Masanobu, 4,894,206, Cl. 422-249.000.
Kabushiki Kaisha Toyota Chuo Kenkyusho: *See*—
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Okada, Akane; Kawasumi, Masaya; Kohzaki, Masao; Fujimoto, Megumi; Kojima, Yoshitsugu; Kurauchi, Toshio; and Kamigaito, Osami, 4,894,411, Cl. 524-710.000.
Kabushiki Kaisha Ueno Seiyaku Oyo Kenkyujo: *See*—
Ueno, Ryuzo; Katsura, Shinichi; Uchiyama, Yoshirou; and Inoue, Satomi, 4,894,359, Cl. 503-209.000.
Kagawa, Kazuyoshi; and Hakozaki, Takeshi, to Alps Electric Co., Ltd. Push button switch having radial leads. 4,894,498, Cl. 200-284.000.
Kahkipuro, Matti, to Kone Elevator GmbH. Bi-directional d.c./d.c. converter compatible with an inverter bridge. 4,894,765, Cl. 363-124.000.
Kaiser, Gunther: *See*—
Gross, Helmut; Hoptner, Wolfgang; and Kaiser, Gunther, 4,893,602, Cl. 123-492.000.
Kakehi, Toru: *See*—
Matsui, Katsumasa; Ohba, Masahiro; Kakehi, Toru; and Nishizawa, Kazutoshi, 4,893,480, Cl. 62-225.000.
Kakimoto, Syoichi; Fujiwara, Masatoshi; and Takahashi, Syogo, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor laser and method for production thereof. 4,894,834, Cl. 372-44.000.
Kakite, Keizi: *See*—
Hayashi, Yutaka; Tomonari, Shigeaki; and Kakite, Keizi, 4,894,699, Cl. 357-30.000.
Kakuma, Osamu: *See*—
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Kakuta, Yoshiyuki, to Pioneer Electronic Corporation. Optical power control device for semiconductor light emitting element. 4,894,525, Cl. 250-205.000.
Kaladas, Jeff J.: *See*—
Peiffer, Dennis G.; and Kaladas, Jeff J., 4,894,422, Cl. 525-420.000.
Kalain, Terry M.; Yutko Jr., Edward M.; and Williams, Peter C., to Whitey Co. Stem packing assembly for frequent cycling valve. 4,893,781, Cl. 251-214.000.
Kalamon, Bruce P.; and Yanusko, David P., to Teleflex Incorporated. Deck box valve operator and position indicator assembly. 4,893,582, Cl. 116-277.000.
Kaleta, Gary S.: *See*—
Berry, William K.; and Kaleta, Gary S., 4,893,717, Cl. 213-188.000.
Hill, Charles C.; Thomas Gareth R.; Kaleta, Gary S.; and Saxton, Gregory J., 4,893,567, Cl. 105-419.000.
Kali-Chemie Aktiengesellschaft: *See*—
Hupe, Bernd; and Walter, Robert, 4,894,357, Cl. 502-233.000.
Kamada, Shuhei, to Sanyo Electric Co., Ltd. Circuit for selectively outputting high frequency signals. 4,894,720, Cl. 358-181.000.
Kaman Aerospace Corporation: *See*—
Flannelly, William G.; Gunsallus, Clifford T.; and Lang, George F., 4,894,787, Cl. 364-508.000.
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Kamikawa, Hiromi, to Maple Toys International Ltd. Flip-over toy vehicle. 4,894,042, Cl. 446-437.000.
Kamiyama, Koji: *See*—
Okazaki, Yoji; Kamiyama, Koji; and Okazaki, Masaki, 4,893,888, Cl. 350-96.120.
Kamo, Tomoichi: *See*—
Takeuchi, Seiji; Ebara, Katsuya; Kamo, Tomoichi; Iwamoto, Kazuo; Horiba, Tatsuo; Kumagai, Teruo; Tamura, Kouki; and Kitami, Kunko, 4,894,355, Cl. 502-101.000.
Kamuro, Setsufumi, to Sharp Kabushiki Kaisha. Semiconductor device. 4,894,705, Cl. 357-71.000.
Kanamaru, Hisanobu; and Harada, Kouji, to Hitachi, Ltd. Universal joint having driving pins parallel to one of coupled shafts and swingably and radially slidable to the other shaft. 4,894,045, Cl. 464-138.000.
Kandler, William C., to Tecumseh Products Company. Engine cylinder assembly having an intake cross-passageway. 4,893,597, Cl. 123-195.0HC.
Kane, Robert C., to Motorola, Inc. Directional waveguide-finline coupler. 4,894,627, Cl. 333-113.000.
Kaneko, Shouji, to NEC Corporation. Buffer circuit operable with reduced power consumption. 4,894,559, Cl. 307-530.000.
Kaneko, Tetsuya: *See*—
Shimoda, Isamu; Miyawaki, Mamoru; Suzuki, Akira; Kaneko, Tetsuya; Tsukamoto, Takeo; Takeda, Toshihiko; and Okunuki, Masahiko, 4,894,611, Cl. 324-158.00R.
Kaneshiro, Glenn T. Cooking pot lid stand. 4,893,771, Cl. 248-176.000.
Kaneyuki, Kazutoshi, to Mitsubishi Denki Kabushiki Kaisha. Engine starting and charging device. 4,894,553, Cl. 290-31.000.
Kaneyuki, Kazutoshi, to Mitsubishi Denki Kabushiki Kaisha. Compact unitary starting motor and charging generator with recessed clutch. 4,894,570, Cl. 310-113.000.
Kang, Jong K. Liquefied petroleum gas and electric water heater. 4,893,610, Cl. 126-360.00R.
Kanno, Masahide: *See*—
Uchikubo, Akinobu; Sasaki, Masahiko; Saito, Katsuyuki; Kanno, Masahide; and Hasegawa, Jun, 4,894,715, Cl. 358-98.000.
Kansai Paint Co., Ltd.: *See*—
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Kanter, Nicole, to S.E.T.A. Process for treating a hydrocarbon plant material and product produced thereby. 4,894,244, Cl. 426-46.000.
Kanthal Corporation, The: *See*—
Hurko, Bohdan, 4,894,515, Cl. 219-345.000.
Kanzaki Kokyukoki Mfg. Co. Ltd.: *See*—
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Kanzaki Paper Manufacturing Co.: *See*—
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Kaplan, Donald A.: *See*—
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Kapler, Joseph A.: *See*—
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Karasawa, Hidetoshi: *See*—
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Kartashev, Vladimir A.: *See*—
Kurbanov, Nariman G. K. O.; Ali-Zade, Vagif A.; Kartashev, Vladimir A.; and Zeinalov, Eldar T. O., 4,893,860, Cl. 294-114.000.

Kasama, Yasuhiko: *See*—
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Kashima, Yoshio: *See*—
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Kashimura, Yuichi; Watanabe, Shizuhisa; and Suda, Seiji, to Hitachi, Ltd. Automotive liquid-cooled electronic control apparatus. 4,893,590, Cl. 123-41.310.
Kashiwa, Norio: *See*—
Kioka, Mamoru; Sugi, Masahiro; Toyota, Akinori; and Kashiwa, Norio, 4,894,421, Cl. 525-243.000.
Kashiwada, Ken; Muto, Tadanobu; and Sasaki, Tetsuo, to Shinwa Sangyo Co., Ltd. Synthetic resin heat exchanger unit used for cooling tower and cooling tower utilizing heat exchanger consisting of such heat exchanger unit. 4,893,669, Cl. 165-38.000.
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Lagow, Richard J.; Bierschenk, Thomas R.; Juhlke, Timothy J.; and Kawa, Hajimu M., 4,894,484, Cl. 568-615.000.
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Ueniahi, Kazuya; Kawabe, Yasumasa; and Kokubo, Tadayoshi, 4,894,311, Cl. 430-192.000.
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Kawaguchi, Hideo: *See*—
Takayanagi, Takashi; and Kawaguchi, Hideo, 4,894,180, Cl. 252-299.010.
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Okamura, Hisatake; Tsuru, Teruhisa; and Kawaguchi, Masahiko, 4,894,629, Cl. 333-177.000.
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Kemper, Hans A. Removable bridge profile for floor joints. 4,893,449, Cl. 52-464.000.
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Kennedy, Lawrence C.; and Strader, James O., to General Motors Corporation. Electromagnetic control assembly and method for a viscous fluid fan clutch. 4,893,703, Cl. 192-58.00B.
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Vukson, Stephen P.; Fritta, David H.; Leonard, John F.; and Kim, Kwang Y., 4,894,298, Cl. 429-50.000.
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Guthrie, David W.; and Weber, Robert E., 4,894,280, Cl. 428-224.000.
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Takeda, Eiji; Itoh, Kiyoo; Hori, Ryoichi; Shimohigashi, Katsuhiro; and Kimura, Katsutaka, 4,894,696, Cl. 357-23.600.
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Industrial Company, Ltd. FRP pipe with threaded ends. 4,893,658, Cl. 138-109.000.

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Kimura, Shuzo: *See*—
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Morita, Tadashi; Nomura, Kazuhiro; and Matsushima, Yoshiyuki, 4,894,158, Cl. 210-497.200.

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Kitchell, Judith P.: *See*—
Moreau, Jacques-Pierre; and Kitchell, Judith P., 4,894,231, Cl. 424-426.000.

Kitchen, Robert D., to Honeywell, Inc. Fiber optic snap acting switch. 4,894,530, Cl. 250-227.000.

Kiuchi, Kazuhide: *See*—
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Klein, Edward. Modular communications socket lock. 4,893,488, Cl. 70-360.000.

Klein, Keith W.: *See*—
Castonguay, Roger N.; Nagy, Joseph G.; Bernier, Richard E.; Ciarcia, Ronald D.; and Klein, Keith W., 4,894,631, Cl. 335-167.000.

Klein, Max, to Tech Paper, Inc. Portable air cleaner. 4,894,071, Cl. 55-97.000.

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Kleinwachter, Jurgen, to Ulrich Luboschik. Solar energy collection and storage apparatus. 4,893,611, Cl. 126-437.000.

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Lonn, Alan H.; and Klett, Gene R., 4,893,875, Cl. 299-91.000.

Kliff, Steven L.: *See*—
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Kling, Waldemar: *See*—
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Klink, Siegfried: *See*—
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Klinkert, Mo-Quen: *See*—
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Klotz, James R.: *See*—
Nogle, Thomas D.; and Klotz, James R., 4,893,652, Cl. 137-596.170.

Klotz, Manfred. Hand tool for cleaning smooth surfaces, in particular panes of glass. 4,893,370, Cl. 15-121.000.

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Knowles, Jonathan; Penttila, Merja; Tæri, Tuula; Nevalainen, Helena; Salovuori, Irma; and Lehtovaara-Helenius, Paivi, to Oy Alko AB. Yeast strains producing cellulolytic enzymes and methods and means for constructing them. 4,894,338, Cl. 435-172.300.

Knudsen, Michael J.: *See*—
Hemmady, Jayant G.; Knudsen, Michael J.; Nichols, Robert K.; Richards, Gaylord W.; and Roediger, Gary A., 4,894,824, Cl. 370-58.300.

Knudsen, Philip D.: *See*—
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Nakasuna, Seiko; Kawarai, Takeshi; Toyoshima, Shuji; Kobayashi, Hirotaka; and Nishiyama, Takanori, 4,894,731, Cl. 360-9.100.

Kobayashi, Ko, to Teac Corporation. Disc recording and/or reproducing apparatus. 4,894,739, Cl. 360-97.020.

Kobayashi, Noboru, to Yamaha Hatsudoki Kabushiki Kaisha. Compact planing type boat. 4,893,579, Cl. 114-363.000.

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Sejimo, Yoshimi; Nagasaka, Kohji; and Kobayashi, Takeshi, 4,893,593, Cl. 123-187.50R.

Kobayashi, Yukihiro: *See*—
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Kobler, Ingo, to Man Roland Druckmaschinen AG. Combination web cutting and path switching system. 4,893,534, Cl. 83-107.000.

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Koenig & Bauer Aktiengesellschaft: *See*—
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Koenig, Lawrence W.; and Cripe, David W., to Westinghouse Electric Corp. Circuit for five level waveform synthesis. 4,894,621, Cl. 330-251.000.

Koenig, Wilhelm: *See*—
Trumpp, Gerhard; Koenig, Wilhelm; and Lang, Thomas, 4,894,651, Cl. 340-825.910.

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Iwamoto, Hiroaki; and Kogure, Masaaki, 4,893,873, Cl. 297-452.000.

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Kohne, Bernd: *See*—
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Okada, Akane; Kawasumi, Masaya; Kohzaki, Masao; Fujimoto, Megumi; Kojima, Yoshitsugu; Kuruuchi, Toshio; and Kamigaito, Osami, 4,894,411, Cl. 524-710.000.

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Koito Seisakusho Co., Ltd.: *See*—
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Fujioka, Masanobu, 4,894,861, Cl. 379-374.000.

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Komeyama, Nobuo, to Koyo Seiko Co., Ltd. Coupling. 4,893,962, Cl. 403-288.000.

Kondo, Kazuyuki; Koide, Jun; Yano, Kanji; Tanaka, Makoto; and Tsunoi, Haruo, to Canon Kabushiki Kaisha. Variable magnification copying apparatus. 4,894,682, Cl. 355-55.000.

Kondo, Masaaki: *See*—
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Kondo, Masafumi: *See*—
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Kondo, Takashi: *See*—
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Kondo, Toshinori; and Okikawa, Takao, to Kabushiki Kaisha Toshiba. Data transmission method in optical star network and optical star network system for realizing the same. 4,894,819, Cl. 376-4.000.

Kondo, Yozo: *See*—
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Kondoh, Eiki: *See*—
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Kone Elevator GmbH: *See*—
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Konica Corporation: *See*—
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Konishiroku Photo Industry Co., Ltd.: *See*—
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Konno, Kiyotaka: *See*—
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Koontz, Harry S., to PPG Industries, Inc. Heatable windshield temperature control. 4,894,513, Cl. 219-203.000.

Kopp, Richard: *See*—
Grogler, Gerhard; Hess, Heinrich; and Kopp, Richard, 4,894,429, Cl. 528-45.000.

Koppelaars, Willem, to Van Doorne's Transmissie B.V. Transmission belt, cross element for a transmission belt and method and device for the production thereof. 4,894,049, Cl. 474-240.000.

Korber AG: *See*—
Heitmann, Uwe; and Goldbach, Manfred, 4,893,640, Cl. 131-84.400.

Korsky, Vincent V.; Krzyszczyk, Rajmund; and Lim, Jin T., to TIE/-communications, Inc. Trunk interface circuitry for telephone systems. 4,894,860, Cl. 379-240.000.

Korthoff, Herbert W.: *See*—
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Koseki, Ryoji, to Amada Company, Limited. Gas blower support device for laser generators. 4,893,780, Cl. 248-638.000.

Kosonocky, Walter F.: *See*—
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Yoshitome, Eiji; Hoshino, Kazuya; and Kosugi, Susumu, 4,894,616, Cl. 324-309.000.

Kotani, Morikatu: *See*—
Akamatsu, Yoshinobu; Kotani, Morikatu; Goto, Toshihide; Hibi, Kenji; and Matsushima, Toshihiko, 4,893,387, Cl. 29-121.100.

Kotha, Kirston E.: *See*—
Stevens, Paul; Houston, L. L.; Kotha, Kirston E.; and Isell, Brian, 4,894,227, Cl. 424-85.200.

Kotick, Michael: *See*—
Auerswald, Ernst-August; Schroder, Werner; Schnabel, Eugen; Bruns, Wolfgang; Reinhardt, Gerd; and Kotick, Michael, 4,894,436, Cl. 530-324.000.

Kotur, Donald R. Removable keyboard cover for office machines. 4,893,954, Cl. 400-714.000.

Kowalski, Jerome R., to Hickory Springs Manufacturing Co. Swivel rocker stop assembly. 4,893,871, Cl. 297-270.000.

Koyabu, Kunio: *See*—
Sato, Yoshiyuki; Kiuchi, Kazuhide; Watanabe, Junji; Koyabu, Kunio; Oohata, Masanobu; and Aoki, Katsuhiko, 4,894,706, Cl. 357-72.000.

Koyama, Takashi: *See*—
Kawahara, Eiichiro; Furumoto, Mitsumasa; and Koyama, Takashi, 4,893,548, Cl. 91-499.000.

Koyo Seiko Co., Ltd.: *See*—
Komeyama, Nobuo, 4,893,962, Cl. 403-288.000.

Kraatz, Udo: *See*—
Holmwood, Graham; Kraatz, Udo; Buchel, Karl H.; Brandes, Wilhelm; Dutzmann, Stefan; and Reinecke, Paul, 4,894,383, Cl. 514-383.000.

Kraft, Robert; and Hasson, Victor H. Electron beam preionization of a high pressure self-sustaining gas laser. 4,894,838, Cl. 372-86.000.

Kraft Systems, Inc.: *See*—
Glau, Gordon, 4,894,491, Cl. 174-135.000.

Kramer, Carl; and Gerhardt, Hans J. Apparatus for contactless sealing of an opening against emerging or entering gas. 4,894,009, Cl. 432-64.000.

Kramme, Roland: *See*—
Neumann, Peter; Martin, Hans-Dieter; Kramme, Roland; and Weimann, Ralf T., 4,894,483, Cl. 568-335.000.

Kranen, Peter H.: *See*—
Maas, Henricus G. R.; Van Der Velden, Johannes W. A.; Kranen, Peter H.; Van De Goor, Albertus T. M.; and Noorlag, Date J. W., 4,894,702, Cl. 357-34.000.

Kransco: *See*—
Brown, Russell S., III, 4,894,034, Cl. 441-65.000.

Krapcho, A. Paul; Hacker, Miles P.; Landi, John J., Jr.; McCormack, J. J.; and Shaw, Kenneth J., to University of Vermont, The. Unsymmetrical 1,4-bis(aminoalkylamino)-anthracene-9, 10-diones and derivatives. 4,894,451, Cl. 544-156.000.

Krause, Dieter; Sedlmaier, Josef; and Odemar, Norbert, to Siemens Aktiengesellschaft. Plug part for releasable plug-type connections of eight waveguide. 4,894,111, Cl. 156-294.000.

Krause, Werner: *See*—
Staendeke, Horst; and Krause, Werner, 4,894,469, Cl. 558-90.000.

Krcova, Zuzna: *See*—
Sulc, Jiri; and Krcova, Zuzna, 4,893,918, Cl. 351-160.00H.

Krech, Robert H.: *See*—
Caledonia, George E.; Krech, Robert H.; Green, Byron D.; and Pirri, Anthony N., 4,894,511, Cl. 219-121.520.

Kremer, Andre: *See*—
Stomp, Hubert; Heintz, Carlo; Kremer, Andre; Monai, Jean; Fries, Daniel; and Devillet, Serge, 4,893,791, Cl. 266-226.000.

Kresse, Heinz, to Siemens Aktiengesellschaft. X-ray diagnostics system having suspended position adjustable components. 4,894,855, Cl. 378-196.000.

Krieg, Gunther: *See*—
Berger, Lutz; Breton, Heimo; Giraud, Helmut; Krieg, Gunther; Gunther, Horst; and Schmitt, Gerhard, 4,894,603, Cl. 324-639.000.

Krieg, Karl-Heinz; and Klink, Siegfried, to Daimler-Benz AG. Control unit for manually controlling reversible electromechanical adjusting devices. 4,894,650, Cl. 340-825.520.

Krisko, Jeffrey M.: *See*—
Doehler, Joachim; and Krisko, Jeffrey M., 4,893,584, Cl. 118-723.000.

Kristiansen, Odd: *See*—
Nyfeler, Robert; Eckhardt, Wolfgang; Beriger, Ernst; and Kristiansen, Odd, 4,894,380, Cl. 514-340.000.

Kritchman, Eliahu; and Arenson, Jerome S., to Elscint Ltd. Reconstruction in CT scanners using divergent beams with flatness correction for reordered data. 4,894,775, Cl. 364-413.160.

Kromrey, Robert V., to United Technologies Corporation. Staged pultrusion molding of composites. 4,894,190, Cl. 264-22.000.

Kroon, Johannes N.; and Schmal, Franciscus, to U.S. Philips Corporation. Method of and device for measuring image lag in X-ray system. 4,894,851, Cl. 378-99.000.

Kruck, Richard W.; Iannelli, Ronald F.; and Laundroche, Kevin S., to Whirlpool Corporation. Modular refrigeration appliance which can be assembled at a remote location. 4,893,478, Cl. 62-126.000.

Krupp Corpoplast: *See*—
Albrecht, Peter; Balkau, Karl-Heinz; Cujic, Vinco; Doring, Tilman; Horwege, Claus; Reymann, Wolfgang; Vogel, Klaus; and Wiedenfeld, Walter, 4,894,198, Cl. 264-521.000.

Krupp Koppers GmbH: *See*—
Kohnen, Klaus; Niermann, Hans; and Semrau, Lothar, 4,893,912, Cl. 350-506.000.

Krzyszczyk, Rajmund: *See*—
Korsky, Vincent V.; Krzyszczyk, Rajmund; and Lim, Jin T., 4,894,860, Cl. 379-240.000.

Kubinec, James J., to Advanced Micro Devices, Inc. Variable length shift register. 4,894,626, Cl. 333-101.000.

Kubo, Masaaki; Umezawa, Hiroshi; and Okura, Kazuhiro, to Kawaken Fine Chemicals Co., Ltd. 7-bromo-beta-carboline compound and method for producing same. 4,894,457, Cl. 546-85.000.

Kubo, Setsuo, to Kabushiki Kaisha Dymosha. Wire drive apparatus for wire saw. 4,893,607, Cl. 125-21.000.

Kubota, Kazuhiro: *See*—
Sunagawa, Masao; Kubota, Kazuhiro; Ishii, Yoshitaro; and Satoh, Susumu, 4,893,376, Cl. 15-337.000.

Kubota, Masanori; Ueno, Sadayasu; Sato, Kanemasa; and Miura, Kiyoshi, to Hitachi, Ltd.; and Hitachi Automotive Engineering Co., Ltd. Angle sensor for throttle valve of internal combustion engine. 4,893,502, Cl. 73-118.100.

Kubota, Toshiharu: *See*—
Sasage, Tsutomu; Noguchi, Masahiko; Nagatani, Hiroyuki; and Kubota, Toshiharu, 4,893,804, Cl. 271-3.100.

Kuehn, Gebhard: *See*—
Maerkl, Robert; Bertleff, Werner; Wilfinger, Hans J.; Schuch, Gunter; Harder, Wolfgang; Kuehn, Gebhard; and Panitz, Paul, 4,894,474, Cl. 560-206.000.

Kuehn, Uwe: *See*—
Gambert, Rudolf; and Kuehn, Uwe, 4,894,138, Cl. 204-415.000.

Kugimiya, Shuzo: *See*—
Suzuki, Hitoshi; Shiotani, Shinobu; Tokunaga, Shinji; Hirai, Tokuyuki; Fukumochi, Yoji; Kugimiya, Shuzo; and Sata, Ichiko, 4,894,779, Cl. 364-419.000.

Kugler, Wolgang, to Accumulatorenfabrik Sonnenschein GmbH. Sealed maintenance-free lead-acid storage battery. 4,894,300, Cl. 429-190.000.

Kuhlerfabrik Langerer & Reich GMBH & Co. KG: *See*—
Zobel, Werner; and Ostertag, Wolfgang, 4,893,391, Cl. 29-157.30R.

Kuhn, Friedrich, to J. M. Voith GmbH. Winding machine with a device to sever the winding roll from the web. 4,893,762, Cl. 242-56.00R.

Kuhn, John B.: *See*—
Stricker, David K.; Kuhn, John B.; Huhmann, Virgil P.; and Chase, William E., 4,893,392, Cl. 29-161.000.

Kuka GmbH: *See*—
Zimmer, Ernst, 4,893,398, Cl. 29-568.000.

Kulik, Yaroslav P.; and Malaev, Alexei A., to Problamnaya Nauchno-Issledovatelskaya Laboratoria Vspomogatelnogo Krovoobraschenia. Device for cleansing measuring pressure in the colon. 4,893,634, Cl. 128-748.000.

Kulischenko, Walter G.: *See*—
Gallant, Ben J.; and Kulischenko, Walter G., 4,893,440, Cl. 51-436.000.

Kuller, Douglas H., to Minnesota Mining and Manufacturing Company. Process of making a unified pressure-sensitive adhesive tape. 4,894,259, Cl. 427-208.800.

Kumada, Akira, to Murata Manufacturing Co., Ltd. Surface potential detecting apparatus. 4,894,607, Cl. 324-96.000.

Kumagai, Teruo: *See*—
Takeuchi, Seiji; Ebara, Katsuya; Kamo, Tomoichi; Iwamoto, Kazuo; Horiba, Tatsuo; Kumagai, Teruo; Tamura, Kouki; and Kitami, Kunko, 4,894,355, Cl. 502-101.000.

Kumasaka, Noriyuki: *See*—
Otomo, Shigekazu; Kumasaka, Noriyuki; Imura, Ryo; Suzuki, Ryo; and Sugita, Yutaka, 4,894,098, Cl. 148-122.000.

Kumasaka, Osamu; and Yamaoka, Nobuki, to Pioneer Electronic Corporation; and Pioneer Video Corporation. Electroless plating method and apparatus. 4,894,260, Cl. 427-241.000.

Kunii, Hideko; Fujishiro, Isei; Shirai, Yasuto; and Kunii, Tosiyasu, to Ricoh Company, Ltd. Data base management system extending structure. 4,894,771, Cl. 364-200.000.

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Kunststoff-Spritzgusswerk Ing. Klaus Burk KG: *See*—
Burk, Klaus; and Burk, Ulrich, 4,893,939, Cl. 366-224.000.

Kunz, Walter: *See*—
Rempfler, Hermann; and Kunz, Walter, 4,894,083, Cl. 71-88.000.

Kuraray Co., Ltd.: *See*—
Toyama, Takuji; and Tanihara, Masao, 4,894,442, Cl. 530-387.000.
Watanabe, Kazunori; and Fuchigami, Yoshio, 4,894,163, Cl. 210-640.000.

Kurauchi, Toshio: *See*—
Okada, Akane; Kawasumi, Masaya; Kohzaki, Masao; Fujimoto, Megumi; Kojima, Yoshitsugu; Kurauchi, Toshio; and Kamigaito, Osami, 4,894,411, Cl. 524-710.000.

Kurbanov, Nariman G. K. O.; Ali-Zade, Vagif A.; Kartashev, Vladimir A.; and Zeinalov, Eldar T. O., to Azerbaidjansky Nauchno-Issledovatelsky I Proektno-Konstruktorsky Institut Neftyanogo Mashino-Stroeniya. Device for gripping and suspending drill pipe stand. 4,893,860, Cl. 294-114.000.

Kureha Kagaku Kogyo K.K.: *See*—
Mizuno, Toshiya; Teramoto, Yoshikichi; Saito, Takeshi; and Wakabayashi, Juichi, 4,894,419, Cl. 525-189.000.

Kuroiwa, Katsumasa: *See*—
Nagasawa, Takeshi; Gemba, Yuko; Nakamura, Yoshio; and Kuroiwa, Katsumasa, 4,894,438, Cl. 530-331.000.

Kusano, Hideaki: *See*—
Watanabe, Yutaka; Kusano, Hideaki; and Ito, Masaaki, 4,894,681, Cl. 355-45.000.

Kusch, Hans-Jurgen: *See*—
Benthake, Norbert; and Kusch, Hans-Jurgen, 4,893,557, Cl. 101-141.000.

Kushner, Mitchell L.: *See*—
Sweeney, Kevin T.; Mattal, Joseph P.; Kushner, Mitchell L.; and Lemke, Robert H., 4,893,925, Cl. 356-72.000.

Kuwahara, Masaaki: *See*—
Takayama, Kazuyoshi; Kuwahara, Masaaki; and Kimura, Shuzo, 4,893,614, Cl. 128-24.00A.

Kuwata, Satoshi; and Fukui, Ikuo, to Shin-Etsu Chemical Co., Ltd. Organopolysiloxane composition. 4,894,224, Cl. 424-78.000.

Kvasnikoff, Georges; Nougayrede, Jean; and Philippe, Andre , to Societe Nationale Elf Aquitaine (Production). Catalytic process for producing sulphur from H_2S containing sour gas. 4,894,216, Cl. 423-574.00R.

Kyla-Heikkila Vaino I.: *See*—
Leiponen, Matti O.; and Kyla-Heikkila Vaino I., 4,894,129, Cl. 204-198.000.

Kyorin Pharmaceutical Co., Ltd.: *See*—
Masuzawa, Kuniyoshi; Suzue, Seigo; Hirai, Keiji; and Ishizaki, Takayoshi, 4,894,458, Cl. 546-156.000.

Kyowa Hakko Kogyo Co., Ltd.: *See*—
Yamaguchi, Kazuo; Saito, Akiko; Sekine, Susumu; Sato, Moriyuki; Itoh, Seiga; Shirahata, Kunikatsu; Hirano, Tetsuya; and Kawauchi, Hiroshi, 4,894,362, Cl. 514-12.000.
Yoshida, Hajime; and Hanai, Nobuo, 4,894,327, Cl. 435-7.000.

Kyrklund, Ben: *See*—
Egnell, Roland; Kyrklund, Ben; Stenfors, Svante; and Harboe, Henrik, 4,893,466, Cl. 60-39.030.

L. R. Nelson Corporation: *See*—
Augustinas, Andrius R.; and Lippitt, Raymond F., 4,893,645, Cl. 137-315.000.

Lacroix, Guy: *See*—
Borrod, Guy; and Lacroix, Guy, 4,894,082, Cl. 71-87.000.

Lader, Harry J.: *See*—
Schroeder, Joseph G.; Shanaberger, Jan L.; Rehman, William R.; Lader, Harry J.; and Noss, Jeffrey S., 4,893,513, Cl. 73-827.000.

Lafon Pharma S.A.: *See*—
Nguyen, Dat-Xuong; Rapin, Jean; and Staron, Thadee, 4,894,393, Cl. 514-476.000.

Lagally, Hermann O.; and Pitterle, Thomas A., to Westinghouse Electric Corp. Steam generator tube antivibration apparatus and method. 4,893,671, Cl. 165-162.000.

Lagarias, Jeffrey C., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Method and apparatus for optimizing system operational parameters through projective transformations. 4,894,773, Cl. 364-402.000.

Lagow, Richard J.; Bierschenk, Thomas R.; Juhlke, Timothy J.; and Kawa, Hajimu M., to Exfluor Research Corporation. Pyrolysis of perfluoropolyethers. 4,894,484, Cl. 568-615.000.

Lagrange, Alain: *See*—
Djega-Mariadassou, Gerald; Tran, Vinh H.; Bureau Tardy, Monique; and Lagrange, Alain, 4,894,185, Cl. 252-519.000.

Lagree, James L.: *See*—
Engel, Joseph C.; and Lagree, James L., 4,894,796, Cl. 364-900.000.

Lahr, Wolfgang: *See*—
Kohne, Hans; Lahr, Wolfgang; and Schmersahl, Hein U., 4,894,235, Cl. 424-452.000.

Lam, Yiu-kuen T.; Chang, Raymond S.; Hensens, Otto D.; Schwartz, Cheryl D.; and Zink, Deborah L., to Merck & Co., Inc. Compositions having fermentation analogs of virginiamycin M_1 as active ingredient. 4,894,370, Cl. 514-183.000.

Lamaze, Airy-Pierre: *See*—
Boutin, Jean; Brun, Pierre; and Lamaze, Airy-Pierre, 4,893,790, Cl. 266-168.000.

Lambert, David V.; Nylund, Theodore W.; Byers, John W.; Haley, Damon E., Jr.; and Cioffi, Joseph V., to Westinghouse Electric Corp. Automated nuclear fuel rod pattern loading system. 4,894,848, Cl. 376-261.000.

Landi, John J., Jr.: *See*—
Krapcho, A. Paul; Hacker, Miles P.; Landi, John J., Jr.; McCormack, J. J.; and Shaw, Kenneth J., 4,894,451, Cl. 544-156.000.

Lane, Andrew P.; Webb, Douglas A.; and Frederick, Gene R., to Texas Instruments Inc. Deposition of silicon-containing films using organosilicon compounds and nitrogen trifluoride. 4,894,352, Cl. 437-238.000.

Lane, Richard J.: *See*—
Ellis, Gordon; and Lane, Richard J., 4,894,516, Cl. 219-378.000.

Lane, Ronald D., to Blount, Inc. Integral dust cover and pump drive. 4,893,407, Cl. 30-123.400.

Lang, George F.: *See*—
Flannelly, William G.; Gunsallus, Clifford T.; and Lang, George F., 4,894,787, Cl. 364-508.000.

Lang, Richard A.: *See*—
Weber, Todd A.; Narr, Albert; Lang, Richard A.; Beck, James A.; Weber, John J., Jr.; and Rasmussen, Gary F., 4,893,745, Cl. 229-1.50R.

Lang, Thomas: *See*—
Trumpp, Gerhard; Koenig, Wilhelm; and Lang, Thomas, 4,894,651, Cl. 340-825.910.

Lange International S.A.: *See*—
Arieh, Simon; and Courvoisier, Guy, 4,893,419, Cl. 36-119.000.
Bidoia, Vancenzo; and Mogno, Orelio, 4,893,384, Cl. 24-68.0SK.
Dalla Lana, Antonio, 4,893,417, Cl. 36-10.000.

Langen, Marinus J. M.; and Guttinger, Peter, to H. J. Langen & Sons Limited. Chain conveyors. 4,893,707, Cl. 198-627.000.

Langenberg, Robert L.: *See*—
Weder, Donald E.; Weder, E. H.; Ruth, Howard M.; King, Michael J.; Craig, Franklin J.; Jones, Larry J.; Badgley, Kenton D.; Snider, Harry J., deceased; Dye, S. Owen; Wiedner, Clay R.; Weder, Bill C.; Langenberg, Robert L.; and Snider, Laura L., 4,893,757, Cl. 241-34.000.

Langendorf, Brian K., to Prime Computer, Inc. Method and apparatus for qualifying branch cache entries. 4,894,772, Cl. 364-200.000.

Lannen Tehtaat Oy: *See*—
Hakli, Reijo; Lehto, Leo; and Lehto, Esa, 4,893,571, Cl. 111-105.000.

Lardiere, Benjamin G., Jr.; and Goldberg, Joshua L, to Dataproducts New England, Inc. Electro-expulsive separation apparatus. 4,894,569, Cl. 310-10.000.

LaRocca, Joseph: *See*—
Fetcenko, Michael A.; Kaatz, Thomas; Sumner, Steven P.; and LaRocca, Joseph, 4,893,756, Cl. 241-33.000.

Larsen, J. K.; and Morris, Michael, to Coloplast A/S. Catheter applicator for urinary incontinence equipment. 4,894,059, Cl. 604-349.000.

Larson, James A.: *See*—
Monie, Vijaykumar S.; Frankowski, Elaine N.; Larson, James A.; Metz, Stephen V.; Nasiruddin, Mohammed; Reed, Michael D.; Richardson, Rose Mae M.; Wilsey, Orvil E.; and Wood, William T., 4,894,829, Cl. 371-20.100.

Larson, James D. Extension apparatus for toenail clippers. 4,893,406, Cl. 30-28.000.

Larson, Ralph: *See*—
Phillips, Richard J.; Glicksman, Leon R.; and Larson, Ralph, 4,894,709, Cl. 357-82.000.

Laser Science, Inc.: *See*—
Javan, Ali, 4,893,923, Cl. 358-28.500.

Laser, Vadim: *See*—
Chadima, George E., Jr.; and Laser, Vadim, 4,894,523, Cl. 235-472.000.

Lass, Joseph; Merkle, Hansjurgen; Becker, Wolfgang; Herget, Werner; and Lob, Erwin, to GAO Gesellschaft fur Automation und Organisation mbH. Identification card with a visible authenticity feature. 4,894,110, Cl. 156-272.800.

Lassalle, Dominique, to BP Chemicals Limited. Polymerisation of olefins using modified ziegler-natta catalyst. 4,894,424, Cl. 526-125.000.

Laundroche, Kevin S.: *See*—
Kruck, Richard W.; Iannelli, Ronald F.; and Laundroche, Kevin S., 4,893,478, Cl. 62-126.000.

Laurent, Sebastian M., to Ethyl Corporation. Zeolites in poultry hatching. 4,893,585, Cl. 119-1.000.

Laurich-Trost, Victor R. Method and apparatus for steering a motor vehicle. 4,893,689, Cl. 180-140.000.

Lauterbach, John H., to Brown & Williamson Tobacco Corporation. Cigarette. 4,893,638, Cl. 131-364.000.

Law Offices of Dick and Harris: *See*—
Schramm, Gary L.; Pontillo, Ralph G.; and Hladilek, Richard J., 4,894,095, Cl. 134-2.000.

Layton, Wilbur T.; Robinson, Dale L.; and Tustaniwskyj, Jerry I., to Unisys Corporation. Method and apparatus for detecting leaks in IC packages by sensing package deflections. 4,893,499, Cl. 73-49.300.

Lazcano-Navarro, Arturo; and Geronimo-Torres, Andres, to Instituto Mexicano de Investigaciones Siderurgicas. Continuous process for the desulphurization of carbonaceous residuals from distillation of petroleum using a plurality of fluidized beds. 4,894,122, Cl. 201-17.000.

Le Barny, Pierre: *See*—
Dubois, Jean C.; Ravaux, Gilles; and Le Barny, Pierre, 4,894,263, Cl. 428-1.000.

Leberzammer, Ernst: *See*—
Feinberg, Bernard; Fryd, Michael; and Leberzammer, Ernst, 4,894,315, Cl. 430-281.000.

Lederman, Frederick E., to General Motors Corporation. Roller clutch with compact wear reduction mechanism. 4,893,702, Cl. 192-45.000.

Lee, Arnold St. J. Method of temperature measurement. 4,893,633, Cl. 128-736.000.

Lee, Ching P.; Vaughn, Eugene T.; and Palmer, Nicholas C., to General Electric Company. Diffusion-cooled blade tip cap. 4,893,987, Cl. 416-92.000.

Lee, Hsin: *See*—
Dixon, Daniel A.; Lee, Hsin; Mysiak, Eugene J.; and Zielke, Henry, 4,894,026, Cl. 439-609.000.

Lee, Sam S.: *See*—
Frusha, John D.; and Lee, Sam S., 4,894,757, Cl. 362-104.000.

Lee, Scott H. Quick release collar. 4,893,810, Cl. 272-123.000.

Lee, Sun. Candle holding device. 4,894,008, Cl. 431-290.000.

Lee, Ta J.; and Hoffman, William F., to Merck & Co., Inc. Intermediates and processes for 6-hydroxymethyl HMG-CoA reductable inhibitors. 4,894,465, Cl. 549-214.000.

Lee, Ta Jyh; and Hoffman, William F., to Merck & Co., Inc. Intermediates and processes for β-6-hydroxymethyl HMG-CoA reductable inhibitors. 4,894,466, Cl. 549-292.000.

Lefevre, Herve ; Bettini, Jean P.; and Botti, Serge, to Thomson-CSF. Method for the detection of polarization couplings in a birefringent optical system and application of this method to the assembling of the components of an optical system. 4,893,931, Cl. 356-351.000.

Leffell, David J.; and Deckelbaum, Lawrence, to Yale University. Optical method and apparatus for detecting and measuring aging, photoaging, dermal disease and pigmentation in skin. 4,894,547, Cl. 250-461.200.

Le Fol, Marcel; and Robic, Pascal, to Automobiles Peugeot; and Automobiles Citroen. Hydroelastic support, in particular for the suspension of a motor in a vehicle. 4,893,797, Cl. 267-140.100.

Le Goff, Jean-Francois, to Aerospatiale Societe Nationale Industrielle. System for coupling two bodies, for example a carriage and a machining station. 4,893,963, Cl. 403-322.000.

Legrady, Janos J.: *See*—
Holden, Homer N.; Loyer, Philip K.; Noyes, Lowell T.; and Legrady, Janos J., 4,894,020, Cl. 439-191.000.

LeGrand, Donald G.; and Olszewski, William V., to General Electric Company. Safety impact resistant laminates having improved interlayer materials. 4,894,282, Cl. 428-332.000.

Lehto, Esa: *See*—
Hakli, Reijo; Lehto, Leo; and Lehto, Esa, 4,893,571, Cl. 111-105.000.

Lehto, Leo: *See*—
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Lehtovaara-Helenius, Paivi: *See*—
Knowles, Jonathan; Penttila, Merja; Teeri, Tuula; Nevalainen, Helena; Salovuori, Irma; and Lehtovaara-Helenius, Paivi, 4,894,338, Cl. 435-172.300.

Leiber, Heinz; and Steiner, Manfred, to Daimler-Benz Aktiengesellschaft. Antilocking system. 4,893,882, Cl. 303-115.000.

Leigh-Monstevens, Keith V.: *See*—
Barker, David C.; and Leigh-Monstevens, Keith V., 4,893,472, Cl. 60-562.000.

Leini, Arvo, to Sandvik AB. Power sawblades for abrasive materials. 4,893,411, Cl. 30-369.000.

Leinonen, Erkki I.; and Aittoniemi, Kari T. J., to Outokumpu Oy. Impulse induced eddy current type detector using plural measuring sequences in detecting metal objects. 4,894,619, Cl. 324-329.000.

Leipe, Hermann: *See*—
Roscher, Gunter; Kleiner, Hans-Jerg; Ihl, Gabriele; and Leipe, Hermann, 4,894,470, Cl. 558-142.000.

Leiponen, Matti O.; and Kyla-Heikkila Vaino I., to Outokumpu Oy. Method and apparatus for positioning sheet-like objects. 4,894,129, Cl. 204-198.000.

Lele, Padmakar P., to Massachusetts Institute of Technology. Diffuse focus ultrasound hyperthermia system. 4,893,624, Cl. 128-399.000.

Lemke, Robert H.: *See*—
Sweeney, Kevin T.; Mattal, Joseph P.; Kushner, Mitchell L.; and Lemke, Robert H., 4,893,925, Cl. 356-72.000.

Lenk, Ronald J., to Honeywell Inc. Active snubber circuit. 4,894,567, Cl. 307-542.000.

Lennon, Dan C. Bicycle and pedal system. 4,893,523, Cl. 74-594.600.

Lenroc Company: *See*—
Stephan, Kurt F., 4,894,452, Cl. 544-192.000.

Lenzen, Josef: *See*—
Thier, Wilhelm; Lenzen, Josef; Uckelmann, Erich, deceased; and Wisniewski, Herbert, 4,893,386, Cl. 28-191.000.

Leonard, Donald A.; and Sweeney, Harold E., to GTE Government Systems Corporation. Method of remotely detecting submarines using a laser. 4,893,924, Cl. 356-43.000.

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Vukson, Stephen P.; Fritts, David H.; Leonard, John F.; and Kim, Kwang Y., 4,894,298, Cl. 429-50.000.

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Durette, Philippe L.; and Gallagher, Timothy F., 4,894,392, Cl. 514-459.000.
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Grabowski, Edward J. J.; and Hughes, David L., 4,894,450, Cl. 540-350.000.
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Hancock, Robert D.; Holtman, Kenneth F.; and Porter, Gene A., 4,893,914, Cl. 350-530.000.

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Juntunen, Timothy J., 4,893,764, Cl. 242-71.900.
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Kuller, Douglas H., 4,894,259, Cl. 427-208.800.
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Rich, Larry D., 4,893,436, Cl. 51-170.0MT.

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Mitsubishi Pencil Co., Ltd.: *See*—
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Miyamoto, Ryoichi; Itoh, Yoshio; Nakano, Yoshikazu; Tsujikado, Mitsuo; and Hosoda, Kenichiro, to Oki Electric Industry Co., Ltd. Double-talk detection in an echo canceller. 4,894,820, Cl. 370-32.100.
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Morishita, Mitsuharu, to Mitsubishi Denki Kabushiki Kaisha. Electric rear wheel steering apparatus. 4,893,688, Cl. 180-79.100.

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Munoz, Jose P.; and Jordan, Raymond M., to Ingersoll-Rand Company. Pressure spike suppressing apparatus. 4,893,753, Cl. 239-578.000.

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Murase, Masakazu; and Shoji, Takashi, to Fuji Photo Film Co., Ltd. Laser recording apparatus with laser intensity control. 4,894,524, Cl. 250-205.000.

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Murphy, Thomas P., to CMB Packaging (UK) Limited. Electrolytic treatment of a surface. 4,894,136, Cl. 204-212.000.

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Nagase, Makoto; Asakura, Yamato; Karasawa, Hidetoshi; Sakagami, Masaharu; Uchida, Shunsuke; Sawa, Toshio; and Ohsumi, Katsumi, to Hitachi, Ltd. Method of inhibiting radioactive substances from eluting into cooling water in a nuclear plant and an apparatus therefor. 4,894,202, Cl. 376-306.000.

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Mitchell, John G., 4,894,614, Cl. 324-208.000.
Wehr, Mary A., 4,894,283, Cl. 428-341.000.
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Nixon, Robert E., Jr. Torque transmitting coupler with shear capability and component separation containment. 4,894,043, Cl. 464-33.000.
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Nogle, Thomas D.; and Klotz, James R., to Chrysler Motors Corporation. Direct-acting, non-close clearance solenoid-actuated valves. 4,893,652, Cl. 137-596.170.
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Mahlich, Gotthard C.; and Borgmann, Michael, 4,893,422, Cl. 38-77.300.
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Layton, Wilbur T.; Robinson, Dale L.; and Tustaniwskyj, Jerry I., 4,893,499, Cl. 73-49.300.
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Catterfeld, Fritz C.; and Wong, George S., 4,893,986, Cl. 415-100.000.
Rosman, Irwin E.; and Wagner, William R., 4,893,673, Cl. 165-167.000.
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Mombrei, Werner; Ottlinger, Peter; Wuchter, Klaus; Rode, Walter; and Schulz, Gunter, 4,894,099, Cl. 148-146.000.
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Rose, Robert E. Lifting device. 4,893,785, Cl. 254-126.000.
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Aig, Edward R.; Coffey, John W.; Lovey, Allen J.; and Rosenberger, Michael, 4,894,480, Cl. 568-11.000.
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Day, John T.; Herder, Robert O.; and McNatt, Robert B., 4,893,576, Cl. 114-219.000.

Rubin, Mac K.: *See*—
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Ruiz, Francisco. Generation of flat liquid sheet and sprays by means of simple cylindrical orifices. 4,893,754, Cl. 239-601.000.

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Ryan, Patrick M.: *See*—
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Hillyard, Carmel J.; Rylatt, Dennis B.; Kemp, Bruce E.; and Bundesen, Peter G., 4,894,347, Cl. 436-540.000.

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Morgan, Lee W.; Esser, Richard J.; and Jensen, Dennis P., 4,894,397, Cl. 523-201.000.

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Sachetti, Terrance W. Method of making protection cover. 4,894,101, Cl. 156-67.000.

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Peterson, Steven H.; Pebler, Alfred R.; Sadhir, Rajender K.; Pearce Jr., Henry A.; and Claiborne, C. Clair, 4,894,532, Cl. 250-227.000.

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Saito, Kazuhiro; and Mori, Taiichi, to Nippon Mining Company, Limited. Thin-film laminated magnetic heads of Fe-Si-Al alloy. 4,894,742, Cl. 360-126.000.

Saito, Ryuichi; and Momma, Naohiro, to Hitachi, Ltd. Stacked MOS transistor flip-flop memory cell. 4,894,801, Cl. 365-154.000.

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Sato, Yoshihisa; Akiyama, Susumu; Hirabayashi, Yuji; Ina, Katsuhiro; Ito, Katsunori; Saito, Takao; and Tanigawa, Tetsuo, 4,894,781, Cl. 364-431.110.

Saito, Takeshi: *See*—
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Saito, Yoshihiko; and Matsushita, Yoshiaki, to Kabushiki Kaisha Toshiba. Two step vapor-phase epitaxial growth process for control of autodoping. 4,894,349, Cl. 437-95.000.

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Salomon, Mary F., to Lubrizol Corporation, The. Anti-oxidant compositions. 4,894,174, Cl. 252-48.200.

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Samosek, Michael E. Apparatus for measuring video cassette tape usage. 4,893,414, Cl. 33-501.000.

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Sanden Corporation: *See*—
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Sanderson, Paul H.; and Serkland, Richard C. Aircraft armament apparatus. 4,893,545, Cl. 89-37.190.

Sandoz Ltd.: *See*—
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Sandro Mentasti & C. S.a.S.: *See*—
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Sastrade Limited: *See*—
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Sato, Tetsuro, to Fuji Jukogyo Kabushiki Kaisha. System for damping lead-lag motion of rotor blades of helicopter. 4,893,988, Cl. 416-140.000.
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Sato, Yoshihisa; Akiyama, Susumu; Hirabayashi, Yuji; Ina, Katsuhiro; Ito, Katsunori; Saito, Takao; and Tanigawa, Tetsuo, to Nippondenso Co., Ltd. Communication control system. 4,894,781, Cl. 364-431.110.
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Sbrana, Adolphe. Floatation apparatus. 4,894,032, Cl. 440-13.000.
Scates, Mark O.; Torrence, G. P.; and Wood, Ronny G., to Hoechst Celanese Corporation. Process for regenerating a carbonylation catalyst solution to remove corrosion metals and carbonylation of methanol to acetic acid. 4,894,477, Cl. 562-519.000.
Scattergood, Edgar M.; and Grabner, Roy W., to Merck & Co., Inc. Recovery and purification of immunogens from immunogen-alum complexes. 4,894,444, Cl. 530-414.000.
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Schade, Gerold; Brandes, Wilhelm; and Hansler, Gerd, to Bayer Aktiengesellschaft. Microbicidal (azolyl-vinyl)-phenol alkenyl ethers. 4,894,381, Cl. 514-383.000.
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Sulc, Jiri; and Krcova, Zuzna, to Ceskoslovenska Akademie Ved. Contact or intraocular lens from lightly crosslinked polymer or copolymer of 2-hydroxyethyl methacrylate and a method for producing thereof. 4,893,918, Cl. 351-160.00H.
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Ohst, Holger; Suling, Carlhans; Schenk, Gunther; Wingender, Kaspar; Peters, Manfred; and Boie, Immo, 4,894,312, Cl. 430-203.000.
Sullivan, John T. Convector tray. 4,893,481, Cl. 62-291.000.
Sum, Phaik E.: *See*—
Wisner, Allan; Sum, Phaik E.; and Schaub, Robert E., 4,894,367, Cl. 514-78.000.
Sumi, Sabarou: *See*—
Tsuchida, Shigeki; Sumi, Sabarou; and Nakagawa, Motohiro, 4,893,884, Cl. 312-107.000.
Sumitomo Electric Industries, Ltd.: *See*—
Matsui, Yuichi, 4,894,691, Cl. 357-22.000.
Shiomi, Akio, 4,894,079, Cl. 65-3.120.
Takimoto, Hiroaki; and Sakamoto, Katsuji, 4,894,078, Cl. 65-3.400.
Yamanouchi, Shosuke; Inoue, Yoshiyuki; and Kondo, Masaaki, 4,894,284, Cl. 428-378.000.
Sumitomo Metal Industries, Ltd.: *See*—
Kimura, Kunitoshi; Arai, Tetsuzo; Matsuoka, Hiroshi; and Nakagawa, Toshiharu, 4,893,658, Cl. 138-109.000.
Sumitomo Wiring Systems, Ltd.: *See*—
Fujimoto, Terutsugu, 4,894,490, Cl. 174-108.000.
Sumner, Steven P.: *See*—
Fetcenko, Michael A.; Kaatz, Thomas; Sumner, Steven P.; and LaRocca, Joseph, 4,893,756, Cl. 241-33.000.
Sunagawa, Masao; Kubota, Kazuhiro; Ishii, Yoshitaro; and Satoh, Susumu, to Hitachi, Ltd. Upright-type electric vacuum cleaner. 4,893,376, Cl. 15-337.000.
Suomen Sokeri Oy: *See*—
Hammer, Frank E.; Scott, Don; Wagner, Fred W.; Ray, Lee; and de la Motte, Rebecca S., 4,894,340, Cl. 435-189.000.
Suppelsa, Anthony B.: *See*—
Urbish, Glenn F.; Balzano, Quirino; Dorinski, Dale W.; McKinley, Martin J.; Ooi, Leng H.; Stoutland, John A.; and Suppelsa, Anthony B., 4,894,663, Cl. 343-702.000.
Surgical Systems & Instruments, Inc.: *See*—
Shiber, Samuel, 4,894,051, Cl. 604-22.000.
Suspension Group, Ltd.: *See*—
Booher, Benjamin V., 4,893,832, Cl. 280-719.000.
Suyama, Takahiro: *See*—
Hayakawa, Toshiro; Suyama, Takahiro; Kondo, Masafumi; and Takahashi, Kosei, 4,894,836, Cl. 372-45.000.
Suzue, Seigo: *See*—
Masuzawa, Kuniyoshi; Suzue, Seigo; Hirai, Keiji; and Ishizaki, Takayoshi, 4,894,458, Cl. 546-156.000.
Suzuki, Akira: *See*—
Shimoda, Isamu; Miyawaki, Mamoru; Suzuki, Akira; Kaneko, Tetsuya; Tsukamoto, Takeo; Takeda, Toshihiko; and Okunuki, Masahiko, 4,894,611, Cl. 324-158.00R.
Suzuki, Hitoshi; Shiotani, Shinobu; Tokunaga, Shinji; Hirai, Tokuyuki; Fukumochi, Yoji; Kugimiya, Shuzo; and Sata, Ichiko, to Sharp Kabushiki Kaisha. Translating apparatus. 4,894,779, Cl. 364-419.000.
Suzuki, Kazuma: *See*—
Iwatsuki, Masashi; Ohi, Kimio; Suzuki, Kazuma; and Miyashita, Kiyoshi, 4,894,538, Cl. 250-306.000.
Suzuki, Koichi: *See*—
Murayama, Noboru; and Suzuki, Koichi, 4,894,729, Cl. 358-447.000.
Suzuki Manufacturing Co., Ltd.: *See*—
Moriya, Akira, 4,893,573, Cl. 112-225.000.
Suzuki, Nobuo, to Fuji Photo Optical Co., Ltd. Prompter. 4,894,722, Cl. 358-225.000.
Suzuki, Nobuo: *See*—
Iwakiri, Toyokazu; Sugiyama, Akira; Kashima, Yoshio; Betsui, Ikuo; and Suzuki, Nobuo, 4,893,889, Cl. 350-96.150.
Suzuki, Ryo: *See*—
Otomo, Shigekazu; Kumasaka, Noriyuki; Imura, Ryo; Suzuki, Ryo; and Sugita, Yutaka, 4,894,098, Cl. 148-122.000.
Suzuki, Ryoichi, to USUI Kokusai Sangyo Kaisha, Ltd. Exhaust brake unit equipped with a pair of swing flap valves. 4,893,698, Cl. 188-273.000.
Suzuki, Tetsuo: *See*—
Ozawa, Masa K.; Ozawa, Kunitaka; Hatanaka, Katsunori; Suzuki, Tetsuo; Mori, Tetsuzo; Shiina, Tadashi; and Ebinuma, Ryuichi, 4,894,668, Cl. 346-136.000.
Suzuki, Toshiya: *See*—
Tanaka, Hiroyuki; Satake, Takeshi; Gozen, Toshikazu; Suzuki, Toshiya; and Utsumi, Atsushi, 4,893,896, Cl. 350-96.310.
Suzuki, Yasuyuki: *See*—
Nonomura, Muneo; Suzuki, Yasuyuki; and Yamada, Masayuki, 4,894,239, Cl. 424-497.000.
Suzuki, Yukio: *See*—
Yaso, Masao; Suzuki, Yukio; Shibata, Kensuke; Mochizuki, Daisuke; and Hayashi, Eiichi, 4,894,453, Cl. 544-354.000.
Suzumura, Nobuyasu: *See*—
Isono, Nobuyuki; and Suzumura, Nobuyasu, 4,893,701, Cl. 192-4.00A.
Svyatsky, Eduard, to Bell & Howell Company. Dot matrix printing system including improved ink transfer mechanism. 4,893,952, Cl. 400-470.000.
Swan, Ellen L.; Basu, Rajat S.; and Shankland, Ian R., to Allied-Signal Inc. Azeotrope-like compositions of 1,1-dichloro-1-fluoroethane, dichlorotrifluoroethane and methanol. 4,894,176, Cl. 252-171.000.
Swanhart, David E.; and Angelini, Carl A., to Trent Box Manufacturing Co., Inc. Collapsible, reusable shipping container. 4,893,746, Cl. 229-23.00R.
Sweeney, Harold E.: *See*—
Leonard, Donald A.; and Sweeney, Harold E., 4,893,924, Cl. 356-43.000.
Sweeney, John: *See*—
Ringleb, Diethelm; Schumann, Reinhard; Stearns, Elsworth; Stylianos, Tom, Jr.; and Sweeney, John, 4,894,605, Cl. 324-537.000.
Sweeney, Kevin T.; Mattal, Joseph P.; Kushner, Mitchell L.; and Lemke, Robert H., to Grumman Aerospace Corporation. Optical measurement system for a display interface unit. 4,893,925, Cl. 356-72.000.
SWF Auto-Electric GmbH: *See*—
Bienert, Herbert; and Walther, Bernd, 4,893,374, Cl. 15-250.040.
Swidwa, Kenneth J.: *See*—
Rohosky, Thomas L.; Swidwa, Kenneth J.; and Marshall, James R., 4,894,849, Cl. 376-268.000.
Swiss Aluminium Ltd.: *See*—
Mizrah, Tiberiu; Maurer, Albert; and Gabathuler, Jean-Pierre, 4,894,074, Cl. 55-482.000.
Switlik Parachute Company, Inc.: *See*—
Switlik, Stanley, 4,894,036, Cl. 441-93.000.

Switlik, Stanley, to Switlik Parachute Company, Inc. Inflator assembly for life vests. 4,894,036, Cl. 441-93.000.
Systemate Holland B.V.: *See*—
Hazenbroek, Jacobus E.; and Verrijp, Bastiaan, 4,893,378, Cl. 17-46.000.
Szabo, Paul D.: *See*—
Georges, Michael K.; Alexandru, Lupu; Dale, William J.; Szabo, Paul D.; and Nelson, Robert A., 4,894,309, Cl. 430-137.000.
Szlam, Aleksander; Crooks, James W., Jr.; Marks, Curtis G.; and Warner, Charles L., II, to Insentions Inc. Method and apparatus for customer account servicing. 4,894,857, Cl. 379-67.000.
T and C Associates: *See*—
Lombardi, John J.; Handline, Michael; and Goode, Gary, 4,893,719, Cl. 220-1.00T.
T-Star Industrial Electronics Corporation: *See*—
Truty, Thomas J., 4,894,504, Cl. 219-69.120.
Tabata, Toshiyuki, to Nissan Motor Company, Limited. Electronically controlled vibration damper for mounting automotive internal combustion engines and the like. 4,893,800, Cl. 267-140.100.
Taguchi, Seiichi: *See*—
Ogawa, Tadashi; Fuchizawa, Tetsuro; Sano, Masaru; Taguchi, Seiichi; and Shiba, Keisuke, 4,894,321, Cl. 430-496.000.
Taguma, Kunito. Back mirror device for vehicle. 4,893,915, Cl. 350-606.000.
Taiho Seiki Co., Ltd.: *See*—
Yamaguchi, Takaharu, 4,893,982, Cl. 414-753.000.
Takaara, Hideo: *See*—
Yamauchi, Kiyoshi; Sato, Shoichi; and Takaara, Hideo, 4,894,100, Cl. 148-402.000.
Takada, Hajime: *See*—
Ichikawa, Fumihiko; Takada, Hajime; and Asano, Kazuya, 4,893,510, Cl. 73-620.000.
Takada, Kazuo: *See*—
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Takagawa, Makoto: *See*—
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Takagi, Noriaki: *See*—
Conkle, Cecil; Shoji, Masahiko; and Takagi, Noriaki, 4,894,558, Cl. 307-296.300.
Takagi, Osamu: *See*—
Hayakawa, Kiyoharu; Matsumoto, Yumio; Ueda, Masashi; Sago, Akira; and Takagi, Osamu, 4,894,680, Cl. 355-27.000.
Takahara, Hideaki: *See*—
Yotsuya, Teruhisa; and Takahara, Hideaki, 4,894,790, Cl. 364-552.000.
Takahashi, Kenji; Nakamura, Takashi; and Hosoi, Yuichi, to Fuji Photo Film Co., Ltd. Radiation image recording and reproducing method and radiation image storage panel employed for the same. 4,894,548, Cl. 250-484.100.
Takahashi, Kosei: *See*—
Hayakawa, Toshiro; Suyama, Takahiro; Kondo, Masafumi; and Takahashi, Kosei, 4,894,836, Cl. 372-45.000.
Takahashi, Masayuki: *See*—
Haruna, Tohru; Takahashi, Masayuki; and Nishikawa, Kazunori, 4,894,400, Cl. 524-91.000.
Takahashi, Mikio; Moribe, Yoshihiro; Maekawa, Hideo; Abo, Takaaki; Yamamoto, Yasuo; Nakamura, Shigeo; and Beppu, Osamu, to Hitachi, Ltd. Disk drive housing structure. 4,894,735, Cl. 360-97.010.
Takahashi, Syogo: *See*—
Kakimoto, Syoichi; Fujiwara, Masatoshi; and Takahashi, Syogo, 4,894,834, Cl. 372-44.000.
Takahashi, Takehiko; Takagawa, Makoto; Furuta, Tomiyoshi; Hidaka, Toshio; and Takada, Kazuo, to Mitsubishi Gas Chemical Company, Inc. Process for producing fatty acids and their ester derivatives. 4,894,188, Cl. 260-410.90R.
Takahashi, Takeshi; Nakamura, Masatake; Yabana, Yoshiji; Ishikawa, Toshiyuki; and Nagata, Koji, to Shimizu Construction Co., Ltd. Electromagnetic shield-type doorway for buildings and electromagnetic shielding system therefor. 4,894,489, Cl. 174-35.0MS.
Takahashi, Tetsuo; Sasaki, Akio; Mogi, Kunio; Shimazaki, Hajime; and Hasegawa, Masakazu, to TDK Corporation. Screen printer with double doctor/squeegee, printing pressure sensor and aligning mechanism. 4,893,556, Cl. 101-123.000.
Takahashi, Toshihiro; Tobita, Hideyuki; Ito, Koichi; and Nakano, Shigeharu, to Hitachi, Ltd. Washing machine. 4,893,484, Cl. 68-12.00R.
Takahashi, Yoichi: *See*—
Ishikawa, Kazuhiko; and Takahashi, Yoichi, 4,894,518, Cl. 219-413.000.
Takahashi, Yoshihiro: *See*—
Abe, Hiraku; Shimojima, Yoji; and Takahashi, Yoshihiro, 4,894,533, Cl. 250-231.0SE.
Takaiwa, Kan, to Canon Kabushiki Kaisha. Image sensing apparatus. 4,894,723, Cl. 358-228.000.
Takamatsu, Junichi: *See*—
Taniguchi, Masami; and Takamatsu, Junichi, 4,894,688, Cl. 355-298.000.
Takamura, Masayuki: *See*—
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Takano, Hiroaki: *See*—
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Takaoka, Yuichi: *See*—
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Takayama, Kazuyoshi; Kuwahara, Masaaki; and Kimura, Shuzo, to Yachiyoda Sangyo Co. Ltd. Apparatus for disintegrating a calculus by an underwater shock wave from outside the human body. 4,893,614, Cl. 128-24.00A.
Takayanagi, Takashi; and Kawaguchi, Hideo, to Fuji Photo Film Co., Ltd. Liquid crystal optical element. 4,894,180, Cl. 252-299.010.
Takayasu, Akira. Lining method using clad pieces and a clad piece for the method. 4,893,744, Cl. 228-184.000.
Takeda Chemical Industries, Ltd.: *See*—
Nonomura, Muneo; Suzuki, Yasuyuki; and Yamada, Masayuki, 4,894,239, Cl. 424-497.000.
Takeda, Eiji; Itoh, Kiyoo; Hori, Ryoichi; Shimohigashi, Katsuhiro; and Kimura, Katsutaka, to Hitachi, Ltd. Dynamic random access memory having a trench capacitor. 4,894,696, Cl. 357-23.600.
Takeda, Shu: *See*—
Yoshinada, Hiroshi; and Takeda, Shu, 4,893,981, Cl. 414-5.000.
Takeda, Toshihiko: *See*—
Shimoda, Isamu; Miyawaki, Mamoru; Suzuki, Akira; Kaneko, Tetsuya; Tsukamoto, Takeo; Takeda, Toshihiko; and Okunuki, Masahiko, 4,894,611, Cl. 324-158.00R.
Takenouchi, Masanori: *See*—
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Takeuchi, Akihiko: *See*—
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Takeuchi, Seiji; Ebara, Katsuya; Kamo, Tomoichi; Iwamoto, Kazuo; Horiba, Tatsuo; Kumagai, Teruo; Tamura, Kouki; and Kitami, Kunko, to Hitachi, Ltd. Flexible, water-repellent baked carbon plate, its production, fuel cell electrode, fuel cell electrode plate and its production and fuel cell. 4,894,355, Cl. 502-101.000.
Takimoto, Hiroaki; and Sakamoto, Katsuji, to Sumitomo Electric Industries, Ltd. Method and apparatus for producing optical fiber. 4,894,078, Cl. 65-3.400.
Takizawa, Koichi; Nakajima, Satoshi; and Arai, Masato, to Omron Tateisi Electronics Co. Enzyme electrode. 4,894,137, Cl. 204-403.000.
Talbot, Kevin T., to Salplex Limited. Information handling and control systems, and methods of testing the condition of electrical loads in such systems. 4,894,648, Cl. 340-825.060.
Talbot, Kevin T., to Salplex Limited. Information handling and control systems, and methods of testing the condition of electrical loads in such systems. 4,894,744, Cl. 361-91.000.
Taliq Corporation: *See*—
Thakar, David H.; and Thakar, Michael N., 4,893,903, Cl. 350-331.00R.
Tam, Chung M.: *See*—
Guiver, Michael D.; Tremblay, Andre Y.; and Tam, Chung M., 4,894,159, Cl. 210-500.410.
Tam International: *See*—
Stokley, Charles O.; and Sanford, Lawrence, 4,893,678, Cl. 166-374.000.
Tamura, Kouki: *See*—
Takeuchi, Seiji; Ebara, Katsuya; Kamo, Tomoichi; Iwamoto, Kazuo; Horiba, Tatsuo; Kumagai, Teruo; Tamura, Kouki; and Kitami, Kunko, 4,894,355, Cl. 502-101.000.
Tamura, Tadashi; Saiki, Shuji; and Sato, Kazue, to Matsushita Electric Industrial Co., Ltd. Speaker system. 4,893,695, Cl. 181-151.000.
Tan, Hiroaki; Kato, Koji; Imuta, Junichi; and Kihara, Noriaki, to Mitsui Petrochemical Industries, Ltd. Alpha-acyloxyketone derivatives. 4,894,475, Cl. 560-251.000.
Tanabe, Ken: *See*—
Nakajima, Hisao; and Tanabe, Ken, 4,894,684, Cl. 355-207.000.
Tanaka, Hirokazu: *See*—
Okuhara, Masakuni; Tanaka, Hirokazu; Goto, Toshio; Kino, Tohru; and Hatanaka, Hiroshi, 4,894,366, Cl. 514-63.000.
Tanaka, Hiroyuki; Satake, Takeshi; Gozen, Toshikazu; Suzuki, Toshiya; and Utsumi, Atsushi, to Mitsubishi Cable Industries, Ltd. Energy transmission optical fiber. 4,893,896, Cl. 350-96.310.
Tanaka, Hisakatsu; Rokutan, Takao; and Gocho, Nagahiro, to Olympus Optical Co., Ltd. Method of writing data on optical card by projecting thereon intensity modulated light beam. 4,894,817, Cl. 369-54.000.
Tanaka, Hitoshi, to Asahi Kogaku Kogyo K.K. Camera having focal length adjusting lens. 4,894,672, Cl. 354-195.120.
Tanaka, Makoto, to Mitsubishi Denki Kabushiki Kaisha. Sputtering method and apparatus. 4,894,132, Cl. 204-192.130.
Tanaka, Makoto: *See*—
Furuno, Kiyotaka; Taniguki, Hidetoshi; Yano, Kouji; Ozaki, Tadashi; Fukuda, Yoshihisa; Fujikawa, Takumi; and Tanaka, Makoto, 4,894,661, Cl. 342-140.000.
Kondo, Kazuyuki; Koide, Jun; Yano, Kanji; Tanaka, Makoto; and Tsunoi, Haruo, 4,894,682, Cl. 355-55.000.
Tanaka, Masaki: *See*—
Okada, Fumio; Tanaka, Masaki; and Ohashi, Hiroshi, 4,894,412, Cl. 524-714.000.
Tanaka, Shinji; Sato, Kazuo; Terasawa, Tsuneo; Kawamura, Yoshio; and Tsuruoka, Hisashi, to Hitachi, Ltd. Chamber plate for use in cell

fusion and a process for production thereof. 4,894,343, Cl. 435-301.000.
Tandy Corporation: *See*—
Mitchell, Dennis R.; Molenda, James R.; and Nakamura, Karl S., 4,8›4,792, Cl. 364-708.000.
Tang, Cha-Min: *See*—
Morad, Martin; and Tang, Cha-Min, 4,894,376, Cl. 514-255.000.
Tanigaki, Hidetoshi: *See*—
Furuno, Kiyotaka; Tanigaki, Hidetoshi; Yano, Kouji; Ozaki, Tadashi; Fukuda, Yoshihisa; Fujikawa, Takumi; and Tanaka, Makoto, 4,894,661, Cl. 342-140.000.
Tanigawa, Tetsuo: *See*—
Sato, Yoshihisa; Akiyama, Susumu; Hirabayashi, Yuji; Ina, Katsuhiro; Ito, Katsunori; Saito, Takao; and Tanigawa, Tetsuo, 4,894,781, Cl. 364-431.110.
Taniguchi, Masami; and Takamatsu, Junichi, to Mita Industrial Co., Ltd. Device for circulating developer. 4,894,688, Cl. 355-298.000.
Tanihara, Masao: *See*—
Toyama, Sakuji; and Tanihara, Masao, 4,894,442, Cl. 530-387.000.
Tanimoto, Kenichi; and Kakuma, Osamu, to Doryokuro Kakunenryo Kaihatsu Jigyodan; and Sugino Machine Limited. Swinging-type automatic examination apparatus for piping. 4,893,512, Cl. 73-622.000.
Tanino, Noriyuki: *See*—
Noda, Minoru; and Tanino, Noriyuki, 4,894,692, Cl. 357-23.200.
Tatzel, Hermann; Zuern, Ludwig; Zettler, Hans D.; Schneider, Wolfgang; and Dembek, Gerhard, to BASF Aktiengesellschaft. Preparation of polyolefin foams. 4,894,191, Cl. 264-53.000.
Taubitz, Bernd: *See*—
Engelsdorf, Kurt; Hagele, Karl-Heinz; Taubitz, Bernd; Tran, Quang N.; and Zieher, Peter, 4,893,699, Cl. 188-299.000.
Taumberger, Franz, to Siemens Aktiengesellschaft. Electro-optical assembly. 4,893,901, Cl. 350-321.000.
Taurus Holdings, Inc.: *See*—
Groswith, Charles T., III; Seipp III, Edwin A.; and Myers, Thomas P., 4,893,836, Cl. 281-28.000.
Tauszik, Giorgio: *See*—
Roffia, Paolo; Paparatto, Giuseppe; Cesana, Alberto; and Tauszik, Giorgio, 4,894,478, Cl. 564-267.000.
Taylor, Joseph S.: *See*—
Ball, Martin F.; Pavely, Andrew P.; and Taylor, Joseph S., 4,893,725, Cl. 220-269.000.
Taylor, Laird C.: *See*—
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Taylor, Philip: *See*—
Steinhardt, Paul J.; and Taylor, Philip, 4,894,726, Cl. 358-298.000.
Taylor, Zenn R.; and Barton, Lester D. Levitating toy flying saucer packaging and storage. 4,894,059, Cl. 446-75.000.
TDK Corporation: *See*—
Takahashi, Tetsuo; Sasaki, Akio; Mogi, Kunio; Shimazaki, Hajime; and Hasegawa, Masakazu, 4,893,556, Cl. 101-123.000.
Tesc Corporation: *See*—
Kobayashi, Ko, 4,894,739, Cl. 360-97.020.
Tech Paper, Inc.: *See*—
Klein, Max, 4,894,071, Cl. 55-97.000.
Techlink Development Limited: *See*—
Chave, Barry J., 4,893,788, Cl. 256-47.000.
Technical Support Services, Inc.: *See*—
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Tecumseh Products Company: *See*—
Kandler, William C., 4,893,597, Cl. 123-195.0HC.
Teeri, Tuula: *See*—
Knowles, Jonathan; Penttila, Merja; Teeri, Tuula; Nevalainen, Helena; Salovuori, Irma; and Lehtovaara-Helenius, Paivi, 4,894,338, Cl. 435-172.300.
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Tektronix, Inc.: *See*—
Wimmer, Guenther W., 4,893,646, Cl. 137-487.500.
Teledyne Industries, Inc.: *See*—
Giordani, Attilio G.; and Sargeant, Jack W., 4,893,609, Cl. 126-350.00R.
Teleflex Incorporated: *See*—
Kalamon, Bruce P.; and Yanusko, David P., 4,893,582, Cl. 116-277.000.
Telettra Telefonia Elettronica e Radio S.p.A.: *See*—
Cucchi, Silvio; Modena, Marco; and Peruta, Roberto, 4,894,710, Cl. 358-13.000.
TenBrink, Ruth E., to Upjohn Company, The. Novel renin inhibiting polypeptide analogs containing S-aryl-D- or L- or DL-cysteinyl, 3-(arylthio)lactic acid or 3-(arylthio)alkyl moieties. 4,894,437, Cl. 530-328.000.
Terada, Katsumi; and Enomoto, Tetsuya, to Sanyo Electric Co., Ltd. Photodetector for receiving an index signal of a beam-index cathode-ray tube. 4,894,531, Cl. 250-227.000.
Teradyne, Inc.: *See*—
Wadell, Brian C.; and Cuddy, Bernard M., 4,894,753, Cl. 361-424.000.
Teramoto, Yoshikichi: *See*—
Mizuno, Toshiya; Teramoto, Yoshikichi; Saito, Takeshi; and Wakabayashi, Juichi, 4,894,419, Cl. 525-189.000.
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Ternoczky, Gyorgy: *See*—
Simonyi, Sandor; Ternoczky, Gyorgy; Valoczi, Gyorgy; and Toth, Istvan, 4,894,780, Cl. 364-424.100.
Tesa, J. Rudolph; and Spector, George. Electronic throwing dart football. 4,893,822, Cl. 273-376.000.
Tesh, David W.; and Wesner, David D., to Amkor Industries, Inc. Roller for spinning frame. 4,893,946, Cl. 384-549.000.
Tews, Helmut: *See*—
Zwicknagl, Hans P.; Tews, Helmut; and Hager, Thomas H., 4,894,350, Cl. 437-184.000.
Texaco Inc.: *See*—
Dowling, Donald J.; and Sims, Jackie C., 4,894,604, Cl. 324-690.000.
Texas Instruments Incorporated: *See*—
Breit, Henry F.; Auguston, Karen A.; and Gondusky, Joseph M., 4,894,293, Cl. 428-614.000.
Lane, Andrew P.; Webb, Douglas A.; and Frederick, Gene R., 4,894,352, Cl. 437-238.000.
Nezuka, Masakazu; Saito, Yuji; and Sato, Yasuhiro, 4,894,634, Cl. 337-343.000.
Thompson, Herbert A.; and Doell, Glenn J., 4,894,643, Cl. 340-593.000.
Textoris, Andre L. N.: *See*—
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Theurer, Josef; and Praschl, Wilhelm, to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H. Mobile track switch working machine. 4,893,565, Cl. 104-7.200.
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Thomas, Charles E., to General Electric Company. Tool break/wear detection using a tracking minimum of detected vibrational signal. 4,894,644, Cl. 340-680.000.
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Thomas, William A. Protector pallet for aircraft wheel assemblies. 4,893,713, Cl. 206-304.000.
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Korsky, Vincent V.; Krzyszczyk, Rajmund; and Lim, Jin T., 4,894,860, Cl. 379-240.000.
Tigelaar, Howard L.; Haken, Roger A.; and Holloway, Thomas C. Single-polysilicon dram device and process. 4,894,693, Cl. 357-23.600.
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Ueda, Shinji; Morigaki, Masakazu; and Aoki, Kozo, to Fuji Photo Film Co., Ltd. Photographic method using bleaching solution containing ferric complex salts and an aromatic compound. 4,894,320, Cl. 430-393.000.

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Yamaguchi, Kazuo; Saito, Akiko; Sekine, Susumu; Sato, Moriyuki; Itoh, Seiga; Shirahata, Kunikatsu; Hirano, Tetsuya; and Kawauchi, Hiroshi, to Kyowa Hakko Kogyo Co., Ltd. Eel growth hormone. 4,894,362, Cl. 514-12.000.

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Frenzel, Bertram; Grenzendorfer, Dietmar; Kemter, Heinz; Wuensch, Wolfgang; and Zeisberg, Peter, 4,893,482, Cl. 66-190.000.
Zenith Electronics Corporation: *See*—
Fendley, James R.; and Jarosz, John M., 4,894,037, Cl. 445-30.000.
Zerrer, Gerhard: *See*—
Hoffmann, Joachim; Angstenberger, Dieter; and Zerrer, Gerhard, 4,893,410, Cl. 30-276.000.
Zettler, Hans D.: *See*—
Tatzel, Hermann; Zuern, Ludwig; Zettler, Hans D.; Schneider, Wolfgang; and Dembek, Gerhard, 4,894,191, Cl. 264-53.000.
Ziegler, Daniel C.: *See*—
Ollinger, James C.; and Ziegler, Daniel C., 4,893,444, Cl. 52-232.000.
Ziegler, Kurt: *See*—
Artzt, Peter; Dallman, Harald; Ziegler, Kurt; and Egbers, Gerhard, 4,893,461, Cl. 57-261.000.
Ziegler, Walter: *See*—
Gassenhuber, Helmut; and Ziegler, Walter, 4,894,552, Cl. 250-572.000.
Zieher, Peter: *See*—
Engelsdorf, Kurt; Hagele, Karl-Heinz; Taubitz, Bernd; Tran, Quang N.; and Zieher, Peter, 4,893,699, Cl. 188-299.000.
Zielinski, Karmella. Therapeutic scrubbing mitten. 4,893,955, Cl. 401-7.000.
Zielke, Henry: *See*—
Dixon, Daniel A.; Lee, Hsin; Mysiak, Eugene J.; and Zielke, Henry, 4,894,026, Cl. 439-609.000.
Ziemek, Gerhard; Staschewski, Harry; and Procher, Klaus, to Kabelmetal Electro GmbH. Method and apparatus for connecting multiple fiber optic conductors. 4,893,892, Cl. 350-96.220.
Zimmer, Ernst, to Kuka GmbH. Device for automatic joining and machining. 4,893,398, Cl. 29-568.000.
Zimmerman, Robert, to Cetus Corporation. Combination therapy using antitumor immunotoxins with tumor necrosis factor. 4,894,225, Cl. 424-85.100.
Zink, Deborah L.: *See*—
Lam, Yiu-kuen T.; Chang, Raymond S.; Hensens, Otto D.; Schwartz, Cheryl D.; and Zink, Deborah L., 4,894,370, Cl. 514-183.000.
Zinser Textilmaschinen GmbH: *See*—
Wolf, Horst, 4,893,460, Cl. 57-105.000.
Zobel, Werner; and Ostertag, Wolfgang, to Kuhlerfabrik Langerer & Reich GMBH & Co. KG. Method and apparatus for producing round-rolled parts for heat exchangers. 4,893,391, Cl. 29-157.30R.
Zuber, John R.: *See*—
Hamamsy, Mahmoud A. E.; Forrest, Stephen R.; and Zuber, John R., 4,894,703, Cl. 357-30.000.
Zuern, Ludwig: *See*—
Tatzel, Hermann; Zuern, Ludwig; Zettler, Hans D.; Schneider, Wolfgang; and Dembek, Gerhard, 4,894,191, Cl. 264-53.000.
Zwicknagl, Hans P.; Tews, Helmut; and Hager, Thomas H., to Siemens Aktiengesellschaft. Method for manufacturing ohmic contacts having low transfer resistances. 4,894,350, Cl. 437-184.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 16TH DAY OF JANUARY, 1990

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Allen, Robert J.: *See*—
Petrow, Henry G.; and Allen, Robert J., Re. 33,149, Cl. 429-40.000.

Carrell, Edwin A.; and Spivey, David H., to Flair International Corporation. Occupancy responsive temperature control system. Re. 33,146, Cl. 165-11.100.

Flair International Corporation: *See*—
Carrell, Edwin A.; and Spivey, David H., Re. 33,146, Cl. 165-11.100.

Honda Giken Kogyo Kabushiki Kaisha: *See*—
Sakata, Mamoru; and Minakawa, Masaaki, Re. 33,148, Cl. 280-666.000.

Minakawa, Masaaki: *See*—
Sakata, Mamoru; and Minakawa, Masaaki, Re. 33,148, Cl. 280-666.000.

Petrow, Henry G.; and Allen, Robert J., to Prototech Company. Finely particulated colloidal platinum composed and sol for producing the same and method of preparation of fuel cell electrodes and the like employing the same. Re. 33,149, Cl. 429-40.000.

Prototech Company: *See*—
Petrow, Henry G.; and Allen, Robert J., Re. 33,149, Cl. 429-40.000.

Reiker, Kenneth H. Ceiling fan mounting assembly. Re. 33,147, Cl. 248-200.100.

Sakata, Mamoru; and Minakawa, Masaaki, to Honda Giken Kogyo Kabushiki Kaisha. Strut type suspension for automobile. Re. 33,148, Cl. 280-666.000.

Spivey, David H.: *See*—
Carrell, Edwin A.; and Spivey, David H., Re. 33,146, Cl. 165-11.100.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

American Environmental International Inc.: *See*—
Tandon, Jag S., B1 4,662,899, Cl. 55-80.000.

Andrier, Bernard, to Entropose GTM pour les Petroliers Maritimes ETPM. Flexible offshore platform. B1 4,505,620, 1-16-90, Cl. 405-224.000.

Brennan, Patrick W.: *See*—
Thomsen, Erik J.; and Brennan, Patrick W., B1 4,253,737, Cl. 350-276.00R.

Energy Conversion Devices, Inc.: *See*—
Ovshinsky, Stanford R.; and Madan, Arun, B1 4,703,336, Cl. 357-30.000.

Entropose GTM pour les Petroliers Maritimes ETPM: *See*—
Andrier, Bernard, B1 4,505,620, Cl. 405-224.000.

Hill, James B.; and Hill, Sally F. Baby carrier. B1 4,436,233, 1-16-90, Cl. 224-159.000.

Hill, Sally F.: *See*—
Hill, James B.; and Hill, Sally F., B1 4,436,233, Cl. 224-159.000.

Innovative Products Corporation: *See*—
Sherrill, John C., B1 4,240,173, Cl. 15-1.700.

Lieberman, Leonard N., to TIF Instruments, Inc. Regulating circuit for gaseous impurity detector. B1 4,282,521, 1-16-90, Cl. 340-632.000.

Madan, Arun: *See*—
Ovshinsky, Stanford R.; and Madan, Arun, B1 4,703,336, Cl. 357-30.000.

Ovshinsky, Stanford R.; and Madan, Arun, to Energy Conversion Devices, Inc. Photodetection and current control devices. B1 4,703,336, 1-16-90, Cl. 357-30.000.

Sherrill, John C., to Innovative Products Corporation. Pool vacuum. B1 4,240,173, 1-16-90, Cl. 15-1.700.

Sun-Flex Co.: *See*—
Thomsen, Erik J.; and Brennan, Patrick W., B1 4,253,737, Cl. 350-276.00R.

Tandon, Jag S., to American Environmental International Inc. Air pollution control system method and apparatus. B1 4,662,899, 1-16-90, Cl. 55-80.000.

Thomsen, Erik J.; and Brennan, Patrick W., to Sun-Flex Co. Anti-glare device for a computer terminal display. B1 4,253,737, 1-16-90, Cl. 350-276.00R.

TIF Instruments, Inc.: *See*—
Lieberman, Leonard N., B1 4,282,521, Cl. 340-632.000.

LIST OF DESIGN PATENTEES

Albert Schulte Sohne GmbH & Co.: *See*—
Luttgen, Hans G., 305,500, Cl. D8-375.000.

AMC International Alfa Metalcraft Corporation: *See*—
Ryser, Theophil, 305,493, Cl. D7-391.000.

American Telephone and Telegraph Company: *See*—
Gilmore, Arthur H.; Johnson, Chris G.; Petty, Norman W.; Seelye, Barbara A.; and Tierney, Thomas J., Jr., 305,537, Cl. D14-101.000.

American Telephone and Telegraphy Company: *See*—
Gilmore, Arthur H.; Johnson, Chris G.; Petty, Norman W.; Seelye, Barbara A.; and Tierney, Thomas J., Jr., 305,538, Cl. D14-101.000.

AT&T Information Systems Inc.: *See*—
Gilmore, Arthur H.; Johnson, Chris G.; Petty, Norman W.; Seelye, Barbara A.; and Tierney, Thomas J., Jr., 305,537, Cl. D14-101.000.
Gilmore, Arthur H.; Johnson, Chris G.; Petty, Norman W.; Seelye, Barbara A.; and Tierney, Thomas J., Jr., 305,538, Cl. D14-101.000.

Autry Industries, Inc.: *See*—
Yung-Mao, Lin, 305,476, Cl. D2-314.000.

Begley, Voula. Doll body or similar article. 305,559, 1-16-90, Cl. D21-189.000.

Bellini, Mario, to Ing. C. Olivetti & C., S.p.A. Printing ribbon cartridge. 305,548, 1-16-90, Cl. D18-12.000.

Bellini, Mario, to Ing. C. Olivetti & C., S.p.A. Printing ribbon cartridge. 305,549, 1-16-90, Cl. D18-12.000.

Bormioli, Pier L., to Vetreria Padana Polesana S.p.A. Jar. 305,503, 1-16-90, Cl. D9-352.000.

Bourque, Rene: *See*—
Hoshizaki, Thomas B.; Hall, Kenneth; and Bourque, Rene, 305,560, Cl. D21-225.000.

Bruno, Robert H.; and Morrison, Keith A., to Kellogg Brush Manufacturing Co. Bath brush. 305,481, 1-16-90, Cl. D4-132.000.

Bryan, Neill E.: *See*—
Conley, James R.; Bryan, Neill E.; and Jonker, Dan J., 305,490, Cl. D7-77.000.

Bulgari, Paolo, to Partecipazioni Bulgari S.p.A. Necklace. 305,509, 1-16-90, Cl. D11-17.000.

Bulgari, Paolo, to Partecipazioni Bulgari S.p.A. Necklace. 305,510, 1-16-90, Cl. D11-17.000.

Bulgari, Paolo, to Partecipazioni Bulgari S.p.A. Ring. 305,511, 1-16-90, Cl. D11-27.000.

Bulgari, Paolo, to Partecipazioni Bulgari S.p.A. Link element. 305,512, 1-16-90, Cl. D11-86.000.

Bulgari, Paolo, to Partecipazioni Bulgari S.p.A. Link element. 305,513, 1-16-90, Cl. D11-93.000.

Bulgari, Paolo, to Partecipazioni Bulgari S.p.A. Link element. 305,514, 1-16-90, Cl. D11-93.000.

Bulgari, Paolo, to Partecipazioni Bulgari S.p.A. Link element. 305,515, 1-16-90, Cl. D11-93.000.

Bulgari, Paolo, to Partecipazioni Bulgari S.p.A. Link element. 305,516, 1-16-90, Cl. D11-93.000.

Bulgari, Paolo, to Partecipazioni Bulgari S.p.A. Link element. 305,517, 1-16-90, Cl. D11-93.000.

Bulgari, Paolo, to Partecipazioni Bulgari S.p.A. Link element. 305,518, 1-16-90, Cl. D11-93.000.

Burbank, Raymond W.: *See—*
Richards, Scott H.; Burbank, Raymond W.; Reid, Kevin C.; and Tate, Ronald C., 305,536, Cl. D14-100.000.

Canon Kabushiki Kaisha: *See—*
Yomo, Takashi, 305,550, Cl. D18-13.000.

Canstar Sports Group, Inc.: *See—*
Hoshizaki, Thomas B.; Hall, Kenneth; and Bourque, Rene, 305,560, Cl. D21-225.000.

Carter, Larry D., to Fiskars Oy Ab. Handle for grass shears. 305,495, 1-16-90, Cl. D8-8.000.

Cates, Robert; and Johnson, Gary M., to La Cocina, Inc. Building. 305,566, 1-16-90, Cl. D25-18.000.

Cerwin, Robert: *See—*
Lahm, William; and Cerwin, Robert, 305,478, Cl. D3-34.000.

Claveria, Ric: *See—*
Maccano, Angelo; and Claveria, Ric, 305,477, Cl. D2-314.000.

Coleman Outdoor Products, Inc.: *See—*
Conley, James R.; Bryan, Neill E.; and Jonker, Dan J., 305,490, Cl. D7-77.000.

Conley, James R.; Bryan, Neill E.; and Jonker, Dan J., to Coleman Outdoor Products, Inc. Insulated food delivery carrier. 305,490, 1-16-90, Cl. D7-77.000.

Corona Clipper Company: *See—*
Jasperson, Stephen, 305,494, Cl. D8-7.000.
Jasperson, Stephen, 305,496, Cl. D8-10.000.
Jasperson, Stephen, 305,497, Cl. D8-13.000.

Crookes, William E.; Drenner, David D.; Kolstad, Owen C.; Peacock, John F.; and Polacek, James H., to Deere & Company. Utility hauling vehicle. 305,519, 1-16-90, Cl. D12-5.000.

D.B.M. Scientific Corp.: *See—*
Malinoff, Don, 305,565, Cl. D24-55.000.

Deere & Company: *See—*
Crookes, William E.; Drenner, David D.; Kolstad, Owen C.; Peacock, John F.; and Polacek, James H., 305,519, Cl. D12-5.000.

Dehari, Tomoshige: *See—*
Miyamoto, Kouichi; Dehari, Tomoshige; and Hoshino, Kiyoshi, 305,542, Cl. D15-133.000.

DeVilbiss Company, The: *See—*
Martinez, Robert, 305,562, Cl. D23-356.000.

Drenner, David D.: *See—*
Crookes, William E.; Drenner, David D.; Kolstad, Owen C.; Peacock, John F.; and Polacek, James H., 305,519, Cl. D12-5.000.

Durakon Industries, Inc.: *See—*
Waters, John E., 305,502, Cl. D9-341.000.

Eisenstadt, Thomas P.: *See—*
Perkins, George; and Eisenstadt, Thomas P., 305,533, Cl. D14-151.000.

ElectroCom Automation, Inc.: *See—*
Weber, Howard F.; and Metivier, Donald E., 305,534, Cl. D14-100.000.

Elmburg, John R.: *See—*
Fischer, Earl L.; and Elmburg, John R., 305,504, Cl. D9-374.000.

Fildan, Gerhard. Clothes hanger. 305,484, 1-16-90, Cl. D6-326.000.

Fischer, Earl L.; and Elmburg, John R., to U.S. Metal Container Co. Fuel can. 305,504, 1-16-90, Cl. D9-374.000.

Fiskars Oy Ab: *See—*
Carter, Larry D., 305,495, Cl. D8-8.000.

Forbes, Hampton E., Jr., to Westvaco Corporation. Carton blank. 305,507, 1-16-90, Cl. D9-433.000.

Gallo, Bruce; and Hannon, Charles, to Telcor, Inc. Rotatable modular connector for a telephone. 305,532, 1-16-90, Cl. D14-256.000.

Ganter, Bernhard. Crank handle for lathes or the like. 305,544, 1-16-90, Cl. D15-142.000.

Gilmore, Arthur H.; Johnson, Chris G.; Petty, Norman W.; Seelye, Barbara A.; and Tierney, Thomas J., Jr., to American Telephone and Telegraph Company; and AT&T Information Systems Inc. Communications workstation. 305,537, 1-16-90, Cl. D14-101.000.

Gilmore, Arthur H.; Johnson, Chris G.; Petty, Norman W.; Seelye, Barbara A.; and Tierney, Thomas J., Jr., to American Telephone and Telegraphy Company; and AT&T Information Systems Inc. Communications workstation. 305,538, 1-16-90, Cl. D14-101.000.

Goodyear Tire & Rubber Company, The: *See—*
Graas, Maurice, 305,526, Cl. D12-149.000.

Graas, Maurice, to Goodyear Tire & Rubber Company, The. Tire. 305,526, 1-16-90, Cl. D12-149.000.

Graco Metal Products Inc.: *See—*
Kohus, Louis M.; Mariol, John V.; and Saint, David, 305,522, Cl. D12-133.000.

Guillemette, A. Roger. Support base for use in automated production. 305,543, 1-16-90, Cl. D15-140.000.

Hall, Kenneth: *See—*
Hoshizaki, Thomas B.; Hall, Kenneth; and Bourque, Rene, 305,560, Cl. D21-225.000.

Hannon, Charles: *See—*
Gallo, Bruce; and Hannon, Charles, 305,532, Cl. D14-256.000.

Hee, Park Kyung: *See—*
Sakata, Kiyoshi, 305,569, Cl. D25-113.000.
Sakata, Kiyoshi, 305,570, Cl. D25-114.000.
Sakata, Kiyoshi, 305,571, Cl. D25-114.000.
Sakata, Kiyoshi, 305,572, Cl. D25-114.000.

Henkel Kommanditgesellschaft auf Aktien: *See—*
Hundertmark, Volker; and Stoeffler, Albert, 305,501, Cl. D9-448.000.

Hirose, Tomoyuki, to Sharp Corporation. Headphone. 305,541, 1-16-90, Cl. D14-205.000.

Honda Giken Kogyo Kabushiki Kaisha: *See—*
Kikuchi, Junji; Shiwa, Nobuyuki; and Watanuki, Yuji, 305,520, Cl. D12-110.000.

Hopkins, Randall E., to Prestige Images, Inc. Imaging baffle for split image prints. 305,545, 1-16-90, Cl. D16-237.000.

Hoshino, Kiyoshi: *See—*
Miyamoto, Kouichi; Dehari, Tomoshige; and Hoshino, Kiyoshi, 305,542, Cl. D15-133.000.

Hoshizaki, Thomas B.; Hall, Kenneth; and Bourque, Rene, to Canstar Sports Group, Inc. Skate boot. 305,560, 1-16-90, Cl. D21-225.000.

Hsu, Junior C. S. Photo frame. 305,483, 1-16-90, Cl. D6-310.000.

Hundertmark, Volker; and Stoeffler, Albert, to Henkel Kommanditgesellschaft auf Aktien. Adhesive dispenser head. 305,501, 1-16-90, Cl. D9-448.000.

Idei, Mitsushige, to Sumitomo Rubber Industries, Ltd. Automobile tire. 305,524, 1-16-90, Cl. D12-147.000.

Idei, Mitsushige, to Sumitomo Rubber Industries, Ltd. Automobile tire. 305,525, 1-16-90, Cl. D12-147.000.

Igarashi, Yasuo, to Sumitomo Rubber Industries, Ltd. Automobile tire. 305,527, 1-16-90, Cl. D12-149.000.

Igarashi, Yasuo, to Sumitomo Rubber Industries, Ltd. Automobile tire. 305,528, 1-16-90, Cl. D12-149.000.

Ing. C. Olivetti & C., S.p.A.: *See—*
Bellini, Mario, 305,548, Cl. D18-12.000.
Bellini, Mario, 305,549, Cl. D18-12.000.

Invacare Corporation: *See—*
Wistrak, Thomas R.; and Ramsey, Roger H., 305,521, Cl. D12-133.000.

Itoh, Kunio, to Pentel Kabushiki Kaisha. Pen cap or similar article. 305,552, 1-16-90, Cl. D19-57.000.

Jasperson, Stephen, to Corona Clipper Company. Pole-mounted pruner hook. 305,494, 1-16-90, Cl. D8-7.000.

Jasperson, Stephen, to Corona Clipper Company. Garden trowel. 305,496, 1-16-90, Cl. D8-10.000.

Jasperson, Stephen, to Corona Clipper Company. Garden cultivator. 305,497, 1-16-90, Cl. D8-13.000.

John Manufacturing Limited: *See—*
Yuen, John S., 305,480, Cl. D4-102.000.

Johnson, Chris G.: *See—*
Gilmore, Arthur H.; Johnson, Chris G.; Petty, Norman W.; Seelye, Barbara A.; and Tierney, Thomas J., Jr., 305,537, Cl. D14-101.000.
Gilmore, Arthur H.; Johnson, Chris G.; Petty, Norman W.; Seelye, Barbara A.; and Tierney, Thomas J., Jr., 305,538, Cl. D14-101.000.

Johnson, Gary M.: *See—*
Cates, Robert; and Johnson, Gary M., 305,566, Cl. D25-18.000.

Jonker, Dan J.: *See—*
Conley, James R.; Bryan, Neill E.; and Jonker, Dan J., 305,490, Cl. D7-77.000.

Joseph, Guy-Claude. Toy figure or the like. 305,557, 1-16-90, Cl. D21-155.000.

Kabushiki Kaisha Fuji Iryoki: *See—*
Yamasaki, Yoshikiyo, 305,563, Cl. D24-36.000.

Kawabe, Kazuo; and Yamasaki, Tsutomu, to Sharp Corporation. Combined tape recorder and radio. 305,540, 1-16-90, Cl. D14-163.000.

Kawaishi, Masayoshi; and Satake, Koji, to Sharp Corporation. Microwave oven. 305,492, 1-16-90, Cl. D7-351.000.

Kellogg Brush Manufacturing Co.: *See—*
Bruno, Robert H.; and Morrison, Keith A., 305,481, Cl. D4-132.000.

Kessler, Beverly A. Toy bird. 305,558, 1-16-90, Cl. D21-160.000.

Kikuchi, Junji; Shiwa, Nobuyuki; and Watanuki, Yuji, to Honda Giken Kogyo Kabushiki Kaisha. Motorcycle. 305,520, 1-16-90, Cl. D12-110.000.

Kinda, Frank L. Seat mount. 305,487, 1-16-90, Cl. D6-496.000.

Kohus, Louis M.; Mariol, John V.; and Saint, David, to Graco Metal Products Inc. Stowable tray for a collapsible stroller. 305,522, 1-16-90, Cl. D12-133.000.

Kolstad, Owen C.: *See—*
Crookes, William E.; Drenner, David D.; Kolstad, Owen C.; Peacock, John F.; and Polacek, James H., 305,519, Cl. D12-5.000.

Korpijaako, E. Pekka. Combined toilet paper holder and shelf. 305,488, 1-16-90, Cl. D6-523.000.

Kronmeyer, Donald J.: *See—*
Milby, Gary A.; and Kronmeyer, Donald J., 305,529, Cl. D12-156.000.

Kunesh, Edward J., to S. C. Johnson & Son, Inc. Bottle and cap. 305,505, 1-16-90, Cl. D9-413.000.

L.A. Gear, Inc.: *See—*
Maccano, Angelo; and Claveria, Ric, 305,477, Cl. D2-314.000.

La Cocina, Inc.: *See*—
Cates, Robert; and Johnson, Gary M., 305,566, Cl. D25-18.000.
Lahm, William; and Cerwin, Robert, to Vistakon, Inc. Contact lens package. 305,478, 1-16-90, Cl. D3-34.000.
Lassiter, Will M. Router bit. 305,498, 1-16-90, Cl. D8-70.000.
Lawton, Peter: *See*—
Strand, Hans; and Lawton, Peter, 305,530, Cl. D13-13.000.
Levie, Mark W., to LK Manufacturing Corporation. Ladle. 305,491, 1-16-90, Cl. D7-104.000.
LK Manufacturing Corporation: *See*—
Levie, Mark W., 305,491, Cl. D7-104.000.
Lo, Woon S., to Zhu Hai Shi Wan Chai Industrial Company. Combined toy trackway and toy animals therefor. 305,556, 1-16-90, Cl. D21-143.000.
Lothamer, Daniel L. Audible window and door intrusion alarm. 305,508, 1-16-90, Cl. D10-106.000.
Luttgen, Hans G., to Albert Schulte Sohne GmbH & Co. Furniture caster. 305,500, 1-16-90, Cl. D8-375.000.
Maccano, Angelo; and Claveria, Ric, to L.A. Gear, Inc. Shoe upper. 305,477, 1-16-90, Cl. D2-314.000.
Malinoff, Don, to D.B.M. Scientific Corp. Pipetting work station. 305,565, 1-16-90, Cl. D24-55.000.
Mariol, John V.: *See*—
Kohus, Louis M.; Mariol, John V.; and Saint, David, 305,522, Cl. D12-133.000.
Martinez, Robert, to DeVilbiss Company, The. Humidifier. 305,562, 1-16-90, Cl. D23-356.000.
Matsumoto, Etsuji: *See*—
Suzuki, Hiroshi; and Matsumoto, Etsuji, 305,531, Cl. D13-24.000.
McMillan, Steven W. Shoulder pad for violin or the like. 305,547, 1-16-90, Cl. D17-20.000.
Metivier, Donald E.: *See*—
Weber, Howard F.; and Metivier, Donald E., 305,534, Cl. D14-100.000.
Michelin Recherche et Technique: *See*—
Remick, Edward M., 305,523, Cl. D12-146.000.
Milby, Gary A.; and Kronmeyer, Donald J. Accessory for open bed trucks for supporting lights thereon above the cab of the truck. 305,529, 1-16-90, Cl. D12-156.000.
Miyamoto, Kouichi; Dehari, Tomoshige; and Hoshino, Kiyoshi, to Ryobi Ltd. Electric miter saw. 305,542, 1-16-90, Cl. D15-133.000.
Morrison, Keith A.: *See*—
Bruno, Robert H.; and Morrison, Keith A., 305,481, Cl. D4-132.000.
Motorola, Inc.: *See*—
Richards, Scott H.; Burbank, Raymond W.; Reid, Kevin C.; and Tate, Ronald C., 305,536, Cl. D14-100.000.
Nordica S.p.A.: *See*—
Sartor, Mariano; and Tonel, Valerio, 305,475, Cl. D2-276.000.
Novak, Wayne F. Rear sight for a pistol. 305,561, 1-16-90, Cl. D22-109.000.
Oka, Shigeo, to Pentel Kabushiki Kaisha. Pen cap or similar article. 305,551, 1-16-90, Cl. D19-57.000.
Park Hyung Hee: *See*—
Sakata, Kiyoshi, 305,573, Cl. D25-114.000.
Park Kyung Hee: *See*—
Sakata, Kiyoshi, 305,568, Cl. D25-113.000.
Sakata, Kiyoshi, 305,574, Cl. D25-113.000.
Partecipazioni Bulgari S.p.A.: *See*—
Bulgari, Paolo, 305,509, Cl. D11-17.000.
Bulgari, Paolo, 305,510, Cl. D11-17.000.
Bulgari, Paolo, 305,511, Cl. D11-27.000.
Bulgari, Paolo, 305,512, Cl. D11-86.000.
Bulgari, Paolo, 305,513, Cl. D11-93.000.
Bulgari, Paolo, 305,514, Cl. D11-93.000.
Bulgari, Paolo, 305,515, Cl. D11-93.000.
Bulgari, Paolo, 305,516, Cl. D11-93.000.
Bulgari, Paolo, 305,517, Cl. D11-93.000.
Bulgari, Paolo, 305,518, Cl. D11-93.000.
Peacock, John F.: *See*—
Crookes, William E.; Drenner, David D.; Kolstad, Owen C.; Peacock, John F.; and Polacek, James H., 305,519, Cl. D12-5.000.
Pentel Kabushiki Kaisha: *See*—
Itoh, Kunio, 305,552, Cl. D19-57.000.
Oka, Shigeo, 305,551, Cl. D19-57.000.
Perkins, George; and Eisenstadt, Thomas P., to TeleQuest, Inc. Combination telephone stand and handset. 305,533, 1-16-90, Cl. D14-151.000.
Petty, Norman W.: *See*—
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266 4,894,154
321.84 4,894,155
448 4,894,156
490 4,894,157
497.2 4,894,158
500.41 4,894,159
510.1 4,894,160
602 4,894,161
603 4,894,162
640 4,894,163
646 4,894,164
654 4,894,165
663 4,894,166
673 4,894,167
4,894,168
698 4,894,169
712 4,894,170
748 4,894,172
772 4,894,171

CLASS 211

46 4,893,714
118 4,893,715

CLASS 213

75 TC 4,893,716
188 4,893,717

CLASS 215

232 4,893,718

CLASS 219

10.43 4,894,501
10.55 E 4,894,503
10.55 M 4,894,502
69.12 4,894,504
76.11 4,894,505
85.22 4,894,506
86.7 4,894,507
110 4,894,508
121.43 4,894,510
121.52 4,894,511
121.6 4,894,509
130.4 4,894,512
203 4,894,513
4,894,514
345 4,894,515
378 4,894,516
388 4,894,517
413 4,894,518
464 4,894,519
497 4,894,520
535 4,894,521

CLASS 220

1 T 4,893,719
4,893,722
5 A 4,893,720
8 4,893,721
85 SP 4,893,723
263 4,893,724
269 4,893,725
403 4,893,726

CLASS 221

81 4,893,727
306 4,893,728

CLASS 222

42 4,893,729
80 4,893,730
92 4,893,731
109 4,893,732
153 4,893,733
4,893,734
168 4,893,735
185 4,893,736
360 4,893,737
380 4,893,738

CLASS 224

159 B1 4,436,233
240 4,893,739

CLASS 226

23 4,893,740
196 4,893,741

CLASS 227

180 4,893,622

CLASS 228

110 4,893,742
181 4,893,743
184 4,893,744

CLASS 229

1.5 R 4,893,745
23 R 4,893,746

CLASS 232

39 4,893,747

CLASS 235

472 4,894,522
4,894,523

CLASS 237

2 A 4,893,748
8 C 4,893,749

CLASS 239

71 4,893,750
150 4,893,751
427.3 4,893,752
578 4,893,753
601 4,893,754
696 4,893,755

CLASS 241

33 4,893,756
34 4,893,757
100 4,893,758
4,893,759
282.2 4,893,760

CLASS 242

46.4 4,893,761
56 R 4,893,762
58.6 4,893,763
71.9 4,893,764
72 R 4,893,765
198 4,893,766

CLASS 244

118.1 4,893,767

CLASS 248

37.3 4,893,768
97 4,893,769
117.1 4,893,770
176 4,893,771
200.1 Re.33,147
235 4,893,772
311.2 4,893,773
398 4,893,774
442.2 4,893,775
475.1 4,893,776
551 4,893,777
610 4,893,778
638 4,893,779
4,893,780

CLASS 250

205 4,894,524
4,894,525
211 R 4,894,526
214 AL 4,894,527
222.1 4,894,528
222.2 4,894,529
227 4,894,530
4,894,531
4,894,532
231 SE 4,894,533
254 4,894,534
255 4,894,535
287 4,894,536
303 4,894,539
306 4,894,537
4,894,538
307 4,894,540
310 4,894,541
336.1 4,894,543
336.2 4,894,542
338.3 4,894,544
423 R 4,894,546
461.2 4,894,547
484.1 4,894,548
492.2 4,894,549
506.1 4,894,550
560 4,894,551
572 4,894,552

CLASS 251

214 4,893,781
356 4,893,782

CLASS 252

8.554 4,894,173
48.2 4,894,174
78.3 4,894,175
171 4,894,176
174.15 4,894,177
189 4,894,178
4,894,179
299.01 4,894,180
299.61 4,894,181
315.2 4,894,182
358 4,894,183
512 4,894,184
519 4,894,185
582 4,894,186
609 4,894,187

CLASS 254

1 4,893,783
100 4,893,784
126 4,893,785
414 4,893,786

CLASS 256

35 4,893,787
47 4,893,788

CLASS 260

364 4,894,545
410.9 R 4,894,188

CLASS 261

136 4,893,796

CLASS 264

15 4,894,189
22 4,894,190
53 4,894,191
68 4,894,192
104 4,894,193
109 4,894,194
134 4,894,195
282 4,894,196
297.2 4,894,197
521 4,894,198

CLASS 266

129 4,893,789
168 4,893,790
226 4,893,791
227 4,893,792
233 4,893,793
271 4,893,794

CLASS 267

1.5 4,893,795
140.1 4,893,797
4,893,798
4,893,799
4,893,800

CLASS 269

6 4,893,801
74 4,893,802

CLASS 270

47 4,893,803

CLASS 271

3.1 4,893,804
204 4,893,805
272 4,893,806

CLASS 272

56.5 R 4,893,807
94 4,893,808
114 4,893,809
123 4,893,810
129 4,893,811
134 4,893,812
145 4,893,813

CLASS 273

82 R 4,893,814
84 ES 4,893,815
146 4,893,816
157 R 4,893,817
212 4,893,818
243 4,893,819
249 4,893,820
371 4,893,821
376 4,893,822

CLASS 277

165 4,893,823

CLASS 280

47.27 4,893,824
81.6 4,893,825
87.021 4,893,826
250.1 4,893,827
414.1 4,893,828
479.2 4,893,829
615 4,893,830
618 4,893,831
666 Re.33,148
719 4,893,832
732 4,893,833
751 4,893,834
808 4,893,835

CLASS 281

28 4,893,836
31 4,893,837
45 4,893,838

CLASS 283

65 4,893,839
81 4,893,840

CLASS 285

15 4,893,841
24 4,893,842
112 4,893,843
113 4,893,844
137.1 4,893,845
156 4,893,846
226 4,893,847
258 4,893,848

CLASS 290

31 4,894,553
55 4,894,554

CLASS 292

7 4,893,849
128 4,893,850
204 4,893,851
251.5 4,893,852
320 4,893,853
341.12 4,893,854
341.17 4,893,855

CLASS 293

106 4,893,856
136 4,893,857

CLASS 294

65.5 4,893,858
103.1 4,893,859
114 4,893,860
119.2 4,893,861

CLASS 296

39.1 4,893,862
76 4,893,863
98 4,893,864
192 4,893,865
214 4,893,866
4,893,867
219 4,893,868
220 4,893,869
223 4,893,870

CLASS 297

270 4,893,871
284 4,893,872
452 4,893,873
483 4,893,874

CLASS 299

91 4,893,875

CLASS 300

8 4,893,876

CLASS 301

108 R 4,893,877

CLASS 303

9.75 4,893,878
71 4,893,879
110 4,893,880
113 4,893,881
4,894,555
115 4,893,882

CLASS 305

10 4,893,883

CLASS 307

106 4,894,556
263 4,894,560
291 4,894,557
296.3 4,894,558
443 4,894,561
455 4,894,562
465 4,894,563
4,894,564
518 4,894,565
530 4,894,559
542 4,894,566
4,894,567
584 4,894,568

CLASS 310

10 4,894,569
68 B 4,894,572
68 C 4,894,571
113 4,894,570
217 4,894,573
258 4,894,574
260 4,894,575
313 D 4,894,576
320 4,894,577
4,894,580
323 4,894,578
328 4,894,579

CLASS 312

107 4,893,884
250 4,893,885
305 4,894,581

CLASS 313

231.01 4,894,582
468 4,894,583
557 4,894,584

CLASS 315

39.51 4,894,586
112 4,894,585
200 R 4,894,587
241 P 4,894,588
248 4,894,589
4,894,590
4,894,591
4,894,592
368 4,894,593

CLASS 318

567 4,894,594
568.1 4,894,596
568.16 4,894,598
568.22 4,894,597
568.24 4,894,595
636 4,894,599
649 4,894,600

CLASS 320

14 4,894,601

CLASS 322

38 4,894,602

CLASS 324

65 R 4,894,606
96 4,894,607
4,894,608
107 4,894,609
127 4,894,610
158 P 4,894,612
158 R 4,894,611
173 4,894,613
208 4,894,614
244 4,894,615
309 4,894,616
329 4,894,617
4,894,618
4,894,619
537 4,894,605
639 4,894,603
690 4,894,604

CLASS 328

127 4,894,620

CLASS 330

251 4,894,621
288 4,894,622

CLASS 331

96 4,894,623

CLASS 332

164 4,894,624

CLASS 333

33 4,894,625
101 4,894,626
113 4,894,627
160 4,894,628
177 4,894,629
185 4,894,630

CLASS 335

167 4,894,631
202 4,894,632

CLASS 337

278 4,894,633
343 4,894,634

CLASS 338

2 4,894,635
9 4,894,636
22 R 4,894,637
162 4,894,638

CLASS 340

444 4,894,639
464 4,894,640
466 4,894,641
467 4,894,652
539 4,894,642
593 4,894,643
632 B1 4,282,521
680 4,894,644
703 4,894,653
747 4,894,646
780 4,894,645
815.200 4,894,647
825.060 4,894,648
825.44 4,894,649
825.52 4,894,650
825.91 4,894,651
932.2 4,894,654
988 4,894,655

CLASS 341

120 4,894,656
158 4,894,657

CLASS 342

90 4,894,658
121 4,894,659
129 4,894,660
140 4,894,661
357 4,894,662

CLASS 343

702 4,894,663

CLASS 346

1.1 4,894,664
4,894,665
76 PH 4,894,666
4,894,712
136 4,894,668
140 R 4,894,667
160 4,894,669

CLASS 350

1.1 4,893,886
3.6 4,893,887
96.12 4,893,888
96.15 4,893,889
96.18 4,893,890
96.20 4,893,891

96.22 4,893,892
96.23 4,893,893
96.29 4,893,894
4,893,895
96.31 4,893,896
96.34 4,893,897
132 4,893,898
255 4,893,899
276 R B1 4,253,737
320 4,893,900
321 4,893,901
331 R 4,893,902
4,893,903
337 4,893,904
338 4,893,905
350 R 4,893,906
350 S 4,893,907
357 4,893,908
377 4,893,909
4,893,910
398 4,893,911
506 4,893,912
515 4,893,913
530 4,893,914
606 4,893,915
637 4,893,916

CLASS 351

41 4,893,917
160 H 4,893,918
205 4,893,919
214 4,894,670
221 4,893,920

CLASS 352

92 4,893,921

CLASS 354

108 4,894,671
195.12 4,894,672
275 4,894,673
4,894,674
308 4,894,675
400 4,894,676
403 4,894,677
415 4,894,678

CLASS 355

18 4,894,679
27 4,894,680
45 4,894,681
55 4,894,682
71 4,894,683
207 4,894,684
246 4,894,685
271 4,894,686
277 4,894,687
298 4,894,688

CLASS 356

1 4,893,922
43 4,893,924
72 4,893,925
123 4,893,926
127 4,893,927
336 4,893,928
4,893,929
345 4,893,930
351 4,893,931
369 4,893,932
376 4,893,933
434 4,893,934
436 4,893,935

CLASS 357

3 4,894,689
4 4,894,690
22 4,894,691
23.2 4,894,692
23.3 4,894,694
23.6 4,894,693
4,894,695
4,894,696
4,894,697
26 4,894,698
30 4,894,699
4,894,700
4,894,701
4,894,703
B1 4,703,336
34 4,894,702
70 4,894,704
71 4,894,705
72 4,894,706
74 4,894,707
80 4,894,708
82 4,894,709

CLASS 358

13 4,894,710
28.5 4,893,923
68 4,894,711
86 4,894,714
98 4,894,715
105 4,894,716
108 4,894,717
133 4,894,713
139 4,894,718
153 4,894,719
181 4,894,720
213.17 4,894,721
225 4,894,722
228 4,894,723
231 4,894,724
243 4,894,725
298 4,894,726
429 4,894,727
447 4,894,729
473 4,894,730

CLASS 360

6 4,894,728
9.1 4,894,731
10.1 4,894,732
31 4,894,733
51 4,894,734
97.01 4,894,735
97.02 4,894,739
97.1 4,894,738
103 4,894,740
113 4,894,741
126 4,894,736
4,894,742
128 4,894,743
130.21 4,894,737

CLASS 361

42 4,894,745
91 4,894,744
275 4,894,746
376 4,894,747
380 4,894,748
383 4,894,749
4,894,750
398 4,894,751
421 4,894,752
424 4,894,753

CLASS 362

66 4,894,754
83 4,894,755
97 4,894,756
104 4,894,757
147 4,894,758
250 4,894,759
293 4,894,760
376 4,894,761

CLASS 363

35 4,894,762
4,894,763
65 4,894,764
124 4,894,765
159 4,894,766

CLASS 364

153 4,894,767
200 4,894,768
4,894,769
4,894,770
4,894,771
4,894,772
402 4,894,773
410 4,894,774
413.13 4,894,776
413.15 4,894,778
413.16 4,894,775
419 4,894,777
4,894,779
424.1 4,894,780
431.02 4,894,782
431.11 4,894,781
479 4,894,783
4,894,784
483 4,894,785
497 4,894,786
508 4,894,787
513 4,894,788
521 4,894,789
552 4,894,790
570 4,894,791
708 4,894,792
709.03 4,894,793
723 4,894,794
807 4,894,795
900 4,894,796
4,894,797
4,894,798

CLASS 365

49 4,894,799
154 4,894,801
185 4,894,802
189.05 4,894,803
190 4,894,804
222 4,894,805

CLASS 366

76 4,893,936
136 4,893,937
208 4,893,938
224 4,893,939
247 4,893,940
265 4,893,941
279 4,893,942
312 4,893,943

CLASS 367

7 4,894,806
15 4,894,807
21 4,894,808
57 4,894,809
118 4,894,810
174 4,894,811

CLASS 368

10 4,894,812
256 4,894,813

CLASS 369

19 4,894,814
54 4,894,816
4,894,817
112 4,894,815

CLASS 370

3 4,894,818
32.1 4,894,820
58.1 4,894,821
58.3 4,894,824
60 4,894,822
4,894,823
4,894,826
124 4,894,825

CLASS 371

8.2 4,894,827
11.3 4,894,828
20.1 4,894,829
22.3 4,894,830
22.5 4,894,800

CLASS 372

19 4,894,831
44 4,894,832
4,894,833
4,894,834
45 4,894,835
4,894,836
72 4,894,837
86 4,894,838
93 4,894,839
108 4,894,840

CLASS 374

46 4,893,944
188 4,893,945

CLASS 375

1 4,894,841
4,894,842
8 4,894,843
42 4,894,844
83 4,894,845
107 4,894,846
121 4,894,847

CLASS 376

4 4,894,819
107 4,894,199
237 4,894,200
261 4,894,201
4,894,848
268 4,894,849
306 4,894,202
416 4,894,203

CLASS 378

62 4,894,850
99 4,894,851
119 4,894,852
138 4,894,853
181 4,894,854
196 4,894,855

CLASS 379

61 4,894,856
67 4,894,857
167 4,894,858
204 4,894,859
240 4,894,860
374 4,894,861
390 4,894,862
395 4,894,863
398 4,894,864

CLASS 384

549 4,893,946
4,893,947
551 4,893,948

CLASS 400

56 4,893,949
185 4,893,950
225 4,893,951
470 4,893,952
582 4,893,953
714 4,893,954

CLASS 401

7 4,893,955
130 4,893,956
146 4,893,957

CLASS 403

7 4,893,958
12 4,893,959
24 4,893,960
232.1 4,893,961
288 4,893,962
322 4,893,963
376 4,893,964

CLASS 405

202 4,893,965
224 B1 4,505,620

CLASS 406

127 4,893,966

CLASS 407

7 4,893,967
54 4,893,968
114 4,893,969

CLASS 408

72 R 4,893,970

CLASS 409

80 4,893,971
299 4,893,972

CLASS 411

55 4,893,973
82 4,893,974
87 4,893,975
180 4,893,976
278 4,893,977
553 4,893,978

CLASS 412

4 4,893,979

CLASS 414

3 4,893,980
5 4,893,981
753 4,893,982

CLASS 415

48 4,893,983
4,893,984
90 4,893,985
100 4,893,986

CLASS 416

92 4,893,987
140 4,893,988
157 R 4,893,989
228 4,893,990

CLASS 417

53 4,893,991
238 4,893,992
269 4,893,993
4,893,994
370 4,893,995

CLASS 418

99 4,893,996
126 4,893,997

CLASS 422

72 4,894,204
197 4,894,205
249 4,894,206
292 4,894,207

CLASS 423

2 4,894,208
15 4,894,209
230 4,894,210
266 4,894,211
328 4,894,212
4,894,213
4,894,214
449 4,894,215
574 R 4,894,216
659 4,894,217

CLASS 424

1.1 4,894,218
9 4,894,219
52 4,894,220
54 4,894,221
59 4,894,222
71 4,894,223
78 4,894,224
85.1 4,894,225
85.2 4,894,226
4,894,227
89 4,894,228
92 4,894,229
409 4,894,230
426 4,894,231
439 4,894,232
440 4,894,233
4,894,234
452 4,894,235
470 4,894,236
486 4,894,237
4,894,238
497 4,894,239
4,894,240
672 4,894,241

CLASS 425

114 4,893,998
174.4 4,893,999
190 4,894,000
200 4,894,001
319 4,894,002
399 4,894,003
435 4,894,004

CLASS 426

29 4,894,242
43 4,894,243
46 4,894,244
68 4,894,245
94 4,894,246
107 4,894,247
121 4,894,248
264 4,894,249
573 4,894,250

CLASS 427

8 4,894,251
4,894,252
36 4,894,253
38 4,894,254
4,894,255
39 4,894,256
78 4,894,257
103 4,894,258
206.8 4,894,259
241 4,894,260
379 4,894,261
393 4,894,262

CLASS 428

1 4,894,263
34.2 4,894,264
34.6 4,894,265
35.4 4,894,266
36.42 4,894,268
36.7 4,894,267
43 4,894,269
125 4,894,270
137 4,894,271
4,894,273
151 4,894,274
156 4,894,272
166 4,894,275
193 4,894,276
198 4,894,277
201 4,894,278
216 4,894,279
224 4,894,280
286 4,894,281
332 4,894,282
341 4,894,283
378 4,894,284
402 4,894,285
408 4,894,286
4,894,287
422 4,894,288
424.2 4,894,289
426 4,894,290
518 4,894,291
524 4,894,292
614 4,894,293

CLASS 429

18 4,894,294
27 4,894,296
31 4,894,297
40 Re.33,149
50 4,894,298
77 4,894,295
104 4,894,299
190 4,894,300
193 4,894,301
194 4,894,302

CLASS 430

13 4,894,303
58 4,894,304
106.6 4,894,305
126 4,894,306
128 4,894,307
137 4,894,308
4,894,309
138 4,894,310
192 4,894,311
203 4,894,312
271 4,894,313
281 4,894,314
4,894,315
316 4,894,316
319 4,894,317
372 4,894,318
383 4,894,319
393 4,894,320
496 4,894,321
505 4,894,322
569 4,894,323
622 4,894,324

CLASS 431

115 4,894,005
116 4,894,006
168 4,894,007
290 4,894,008

CLASS 432

64 4,894,009

CLASS 433

27 4,894,010
81 4,894,011
215 4,894,012

CLASS 434

268 4,894,013

CLASS 435

6 4,894,325
7 4,894,326
4,894,327
4,894,328
29 4,894,329
69.1 4,894,334
69.3 4,894,332
69.51 4,894,330
69.52 4,894,333
94 4,894,331
104 4,894,335
146 4,894,336
156 4,894,337
172.3 4,894,338
182 4,894,339
189 4,894,340
227 4,894,341
291 4,894,342
301 4,894,343
899 4,894,344

CLASS 436

43 4,894,345
85 4,894,346
540 4,894,347
546 4,894,348

CLASS 437

95 4,894,349
184 4,894,350
190 4,894,351
238 4,894,352
239 4,894,353

CLASS 439

17 4,894,014
67 4,894,015
76 4,894,016
78 4,894,017
81 4,894,018
188 4,894,019
191 4,894,020
4,894,021
260 4,894,022
278 4,894,023
535 4,894,024
578 4,894,025
609 4,894,026
699 4,894,027
762 4,894,028
816 4,894,029
874 4,894,030
885 4,894,031

CLASS 440

13 4,894,032

CLASS 441

40 4,894,033
65 4,894,034
79 4,894,035
93 4,894,036

CLASS 445

30 4,894,037

CLASS 446

46 4,894,038
75 4,894,039
91 4,894,040
160 4,894,041
437 4,894,042

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DESIGN PATENTS

05 : 305,504
06 : 305,477
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09 : 305,481
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12 : 305,478
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18 : 305,508

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39 : 305,521
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48 : 305,502
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53 : 305,546
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54 : 305,561
55 : 305,485
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